

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

Ms. Shruti Hemani and Prof. Ravi Mokashi Punekar

DoD, IIT Guwahati

Source:

<http://www.dsource.in/course/visual-design-colour-theory>



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

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2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Introduction

Our environment is a world of colour, both natural and manually manipulated. The Oxford Dictionary describes colour as

- “The property possessed by an object of producing different sensations on the eye as a result of the way it reflects or emits light” and
- “One, or any mixture, of the constituents into which light can be separated in a spectrum or rainbow, sometimes including (loosely) black and white.”

Others define it as

- “General term that refers to the wavelength composition of light, with particular reference to its visual appearance.” [1]

Or

- “A phenomenon of light or visual perception that enables one to differentiate otherwise identical objects” [2].

However, studies so far have shown that colour is not just a physiological reaction, a sensation resulting from different wavelengths on receptors in our eyes, but has an effect on our feelings, behaviour, well-being and preferences as well as choices.

“It is stimulating, calming, expressive, disturbing, impressionable, cultural, exuberant, and symbolic. It pervades every aspect of our lives, embellishes the ordinary, and gives beauty and drama to everyday objects”. Holtzschue, 2002.

“Colour can sway thinking, change actions, and cause reactions. It can irritate or soothe your eyes, raise your blood pressure or suppress your appetite. When used in the right ways, colour can even save on energy consumption”. Morton (www.colourmatter.com)

To this end, the most important functions of colours are to provide visual and psychological information that generates reactions from a viewer. As a powerful form of communication, colour is irreplaceable. Red means “stop” and green means “go.” Traffic lights send this universal message. Likewise, the colours used for a product, packaging, marketing, building interiors, etc. cause powerful reactions. Hence, the artist, architect or designer can provoke various responses and so become the controller of what that viewer perceives [3].

Though there have been many attempts to discover the appropriate use of colour, defining its meanings and understanding its psychological effect, there are no defined set of rules for using colours. More important is careful planning, observation and some theoretical knowledge that can aid designers with use of colours.

Design Course

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[1] Merriam Webster Dictionary

[2] Wikipedia

[3] Feisner E.A., Colour: how to use colour in art and design, Laurence King Publishing, 2006.



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1. Introduction

2. Visual Design

3. The Science of Colour

4. Colour Perception and Human Responses

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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Visual Design

Introduction:

A visual artist is a general term used for any person interested in the visual studies. Such a person may be a painter, a potter, graphic designer, sculptor or a product designer.

This course has been developed for a person interested in understanding the various aspects of Color and its application in Visual Design. The goals of this course is to sensitize the sculptor /artist /designer to the art of visual observation of color in ones surroundings, enhancing ones imagination, learning to conceptualize and create and enhancing ones skills in representation and communications of ideas through play of form and space using color.

It encourages learning by doing. It encourages analysis and discussions on the work done.

Aims:

Color is one of the important elements of visual design. An understanding of aspects of the science and psychological of color on human senses is important for one to appreciate the application of color in visual design.

This course will help you to enhance your understanding of the different aspects of Color Theory and its different design application in Product Design and Interiors.

Course Contents:

This course involve reading material, audio-visual presentations and studio assignments that introduces color as a visual design element; and in understanding underlying concepts and principles of their compositions for visual appeal.

1. Introduction
2. The Science of Colour
3. Colour Perception and Human Responses
4. Colour Description and Colour Theories
5. Colour Interaction and Colour Effects
6. Colour in Design Principles
7. Use of Colours in Products and Packaging Design
8. Use of Colours in Interior Design

1. Introduction
2. **Visual Design**
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

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Kolkata Flower Market: Flowers present a wide variety of colours. Quite often the names of the flowers such as 'rose' red or 'sunflower' yellow are used to explain colours. Some colours such as violet also take their names from the flowers. (Image source: Shruti Hemani, 2009)

Reading Material / Texts:

1. J. Bowers, Introduction to Two-Dimensional Design: Understanding Form and function, John Wiley & Sons, 1999.
2. L. Holtzschue, Understanding Colour: An Introduction for Designers, 2nd Edition, John Wiley and Sons, 2002.
3. W. Wong, Principles of Two Dimensional Design, John Wiley and Sons, 1972.
4. J. Itten, The Art of Color, New York, VNR, 1973.
5. T. W. Knight, Transformations in Design: a formal approach to stylistic change and innovation in visual arts, Cambridge Univ. Press, 1998.
6. J. Bairstow, R. Barber, M. Kenny, Design Modelling - Visualising Ideas in 2 Dimension and 3 Dimension, Hodder and Stoughton, 2005.
7. H.G Greet and R. Kostellow, Elements of Design and the Structure of Visual Relationships, Architectural Press, New York, 2002.

1. Introduction

2. Visual Design

3. The Science of Colour

4. Colour Perception and Human Responses

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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The Science of Colour

Touching, tasting, smelling, hearing, and seeing—these are the ways we get our information about the world. But the world of humans is primarily a world of sights, with 90 percent of what we know of the world coming to us through our vision [1]. What we see is colour. Colour is a visual experience, a sensation of light that cannot be verified by other senses-not by touch, taste, smell, or hearing. The eye's retina absorbs the light sent to us from luminous objects (eg. light bulb) or reflected from a non-luminous object (eg. a table and chair) and sends a signal, or sensation, to the brain. This sensation makes us aware of a characteristic of light, which is colour. Scientifically, light (made up from photons) is just one form of visible energy while colour is simply light of different wavelengths and frequencies. The way in which most of us actually see colour, is through the sensors in the retina of our eyes called rods and cones. The rods are very sensitive to light but are mostly colour blind. The colour detectors in the eye are the cones. Each cone contains one of three pigments sensitive to RED, GREEN or BLUE. Each pigment absorbs a particular wavelength of colour eg. short wavelength cones absorb blue light, middle wavelength cones absorb green light, and long wavelength cones absorb red light.

When we observe a colour that has a wavelength between that of the primary colours red, green and blue, combinations of the cones are stimulated. The result is that we can detect light of all colours in the visible spectrum. Each colour has its own properties with its own wavelength and frequency. The human eye is able to sense wavelengths of light ranging from about 400 nm to about 700 nm. Red is the longest visible wavelength (720 nm), followed in order by orange, yellow, green, blue, indigo, and violet, the shortest visible wavelength (380 nm). ROYGBIV is an acronym for these wavelengths, which are the colours of the visible spectrum. In order for an object to be seen as a colour, the wavelengths that its colorant reflects must be present in the light source. If a red object is placed under a source that lacks the red wavelength, all light reaching the object is absorbed. No colour is reflected back to the eye. A red object is seen as black under green light [2].

1. Introduction
2. Visual Design
3. **The Science of Colour**
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

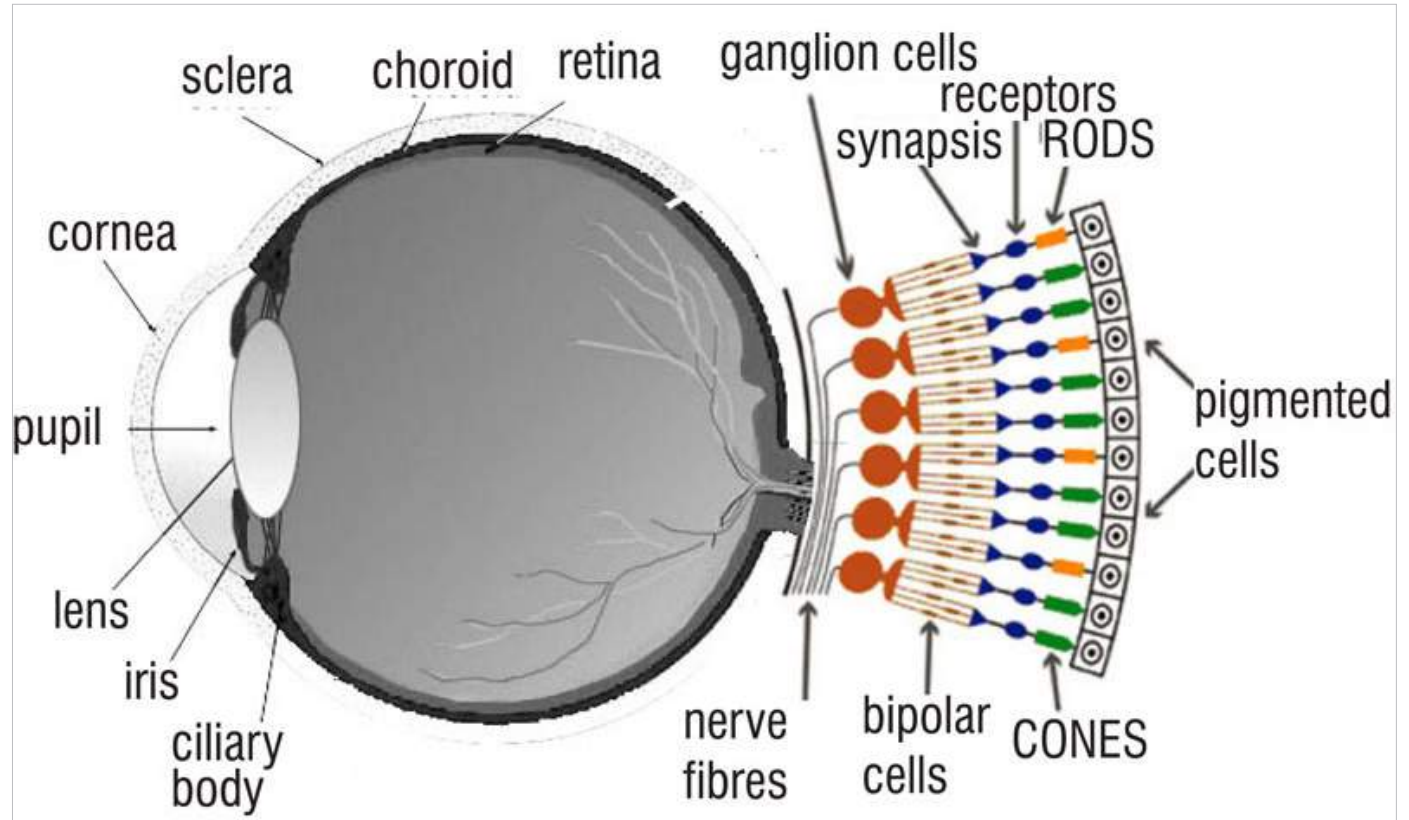
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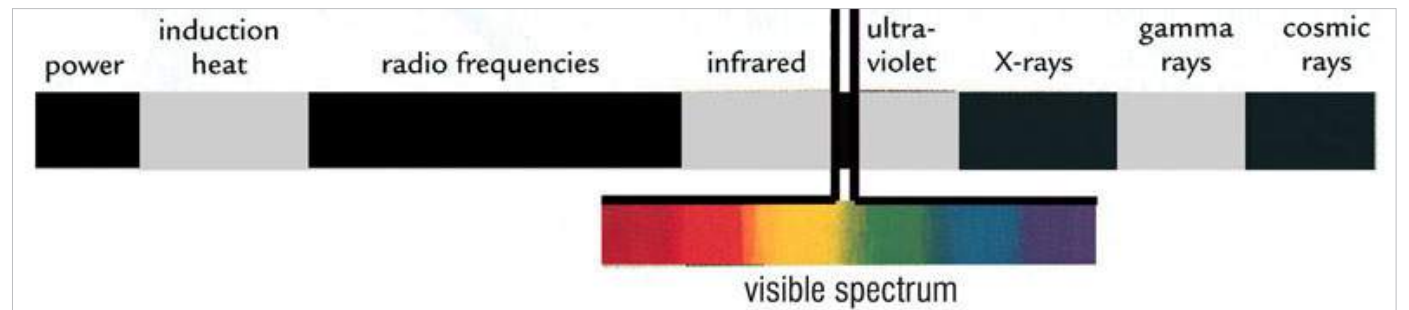
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1. Introduction
2. Visual Design
3. **The Science of Colour**
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



Basic cross section of human eye showing rods and cones.

Source: Colour Therapy Healing, 2010.



Design Course

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Colours in Visual Design

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Source:

<http://www.dsource.in/course/visual-design-colour-theory/science-colour>

1. Introduction
2. Visual Design
3. **The Science of Colour**
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



Roses appear to be red because they contain a red pigment which absorbs most of the visible light spectrum, while reflecting mainly red back to the viewer.

Source (dancer): by Sanjana Reddy <http://www.vogue.in>

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Visual Design - Colour Theory

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<http://www.dsource.in/course/visual-design-colour-theory/science-colour>

1. Introduction
2. Visual Design
3. **The Science of Colour**
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



The position of the light source will determine the angle in which the light will reach the object while the direction of the reflected light beam will influence how colours are perceived in terms of its lightness and darkness.

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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DoD, IIT Guwahati

Source:

<http://www.dsource.in/course/visual-design-colour-theory/science-colour>

Display of density models at Venice Architectural Biennale 2006:

Photo: Shruti Hemani

Transparent, Translucent, Opaque Wine Glasses:

Source: Google



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1. Introduction
2. Visual Design
3. **The Science of Colour**
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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Source:

<http://www.dsource.in/course/visual-design-colour-theory/science-colour>

1. Introduction
2. Visual Design
3. **The Science of Colour**
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Watercolour is described as a luminous medium because light reaches through the colorant of the white of the paper and created coloured effects on the paper. Watercolour on black paper is not luminous, because no light reflects from the black paper surface.

The Science of Colour Theories: [3]

It is the light that generates colours. Without it there is no colour. The sun, a fundamental source of light, is sensed as white (or colourless) but it is made up of mixture of colours which can be seen by passing the sunlight through a prism. There are two theories that explain how colours work and interact. The light or additive theory deals with radiated and filtered light. The pigment or subtractive theory deals with how white light is absorbed and reflected off of coloured surfaces.

• Light Theory:

Light theory starts with black (the absence of light). When all of the frequencies of visible light are radiated together the result is white (sun) light. The colour interaction is diagramed using a colour wheel with red, green and blue as primary colours (Red, Green and Blue). These are the three colours that the cones in the eye sense. This is an RGB colour system. The primary colours mix to make secondary colours: red and green make yellow, red and blue make magenta and green and blue make cyan. All three together add up to make white light. That is why the theory is called additive.

A computer monitor or a coloured television is an example of light theory. The same three primary colours are used and mixed by the eye to produce the range of colours you see on the screen. This theory is also used for dramatic lighting effects on stage in a theatre.

• Pigment Theory:

Pigments behave almost the opposite of light. With pigments a black surface absorbs most of the light, making it look black. A white surface reflects most of the (white) light making it look white. A coloured pigment, red for instance, absorbs most of the frequencies of light that are not red, reflecting only the red light frequency. Because all colours other than the pigment colours are absorbed, this is also called the subtractive colour theory. If most of the red light is reflected the red will be bright. If only a little is reflected along with some of the other colours the red will be dull. A light colour results from lots of white light and only a little colour reflected. A dark colour is the result of very little light and colour reflected.

The primary colours in the pigment theory have varied throughout the centuries but now cyan, magenta and yellow are increasingly being used. These are the primary colours of ink, along with black, that are used in the printing industry. This is a CMYK colour system [Cyan, Magenta, Yellow and (K) black].

Design Course

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Light Effects:

- Opaque, Translucent and Transparent:

If all the light reaching the object is transmitted, the object is transparent eg. Clear glass. When the light reaching the object is partly reflected and partly absorbed, the object is translucent eg. Butter paper or tracing paper. If all the light reaching an object is either reflected or absorbed, the object is opaque eg. Ceramic teapot.

- **Luminosity:**

Luminosity is the attribute of emitting light without heat. A luminous object is light reflective but does not emit heat.

- **Indirect Light/Colour:**

An indirect colour is the variant of indirect light. An indirect colour occurs when a light reaches a highly reflective colour on a broad surface and reflects onto the nearby object which changes its apparent colour due to the reflect light /colour.

Scattering:

The position of the light source will determine the angle in which the light will reach the object while the direction of the reflected light beam will influence how colours are perceived in terms of its lightness and darkness. Different textured surface does not affect the actual colour (wavelength) of the light but a smooth surface will reflect more light directly than a matt or rough surface which reflects light in a more fragmented way. Hence the smooth surface may appear lighter and brighter than a rough surface. Heavily textured or irregular surfaces scatter light in many directions and can create light-dark variations of colours that make it dynamic and lively. Varying textures of surface allows designers to create such effects when their scope is limited to only one colour or material. Emboss materials or frosted glassware create patterns with single colour or material [2].

[1] Miller, H. Experience of Colour, <http://www.hermanmiller.com/>

[2] Holtzschue, L. (2011) Understanding Color:An Introduction for Designers, John Wiley Sons.

[3] The Science of Colour Theory developed from Jim Saw's Art 104: Design and Composition, Palomar College, 2012), <http://daphne.palomar.edu/design/color.html>, 2011

1. Introduction

2. Visual Design

3. **The Science of Colour**

4. Colour Perception and Human Responses

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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Colour Perception and Human Responses

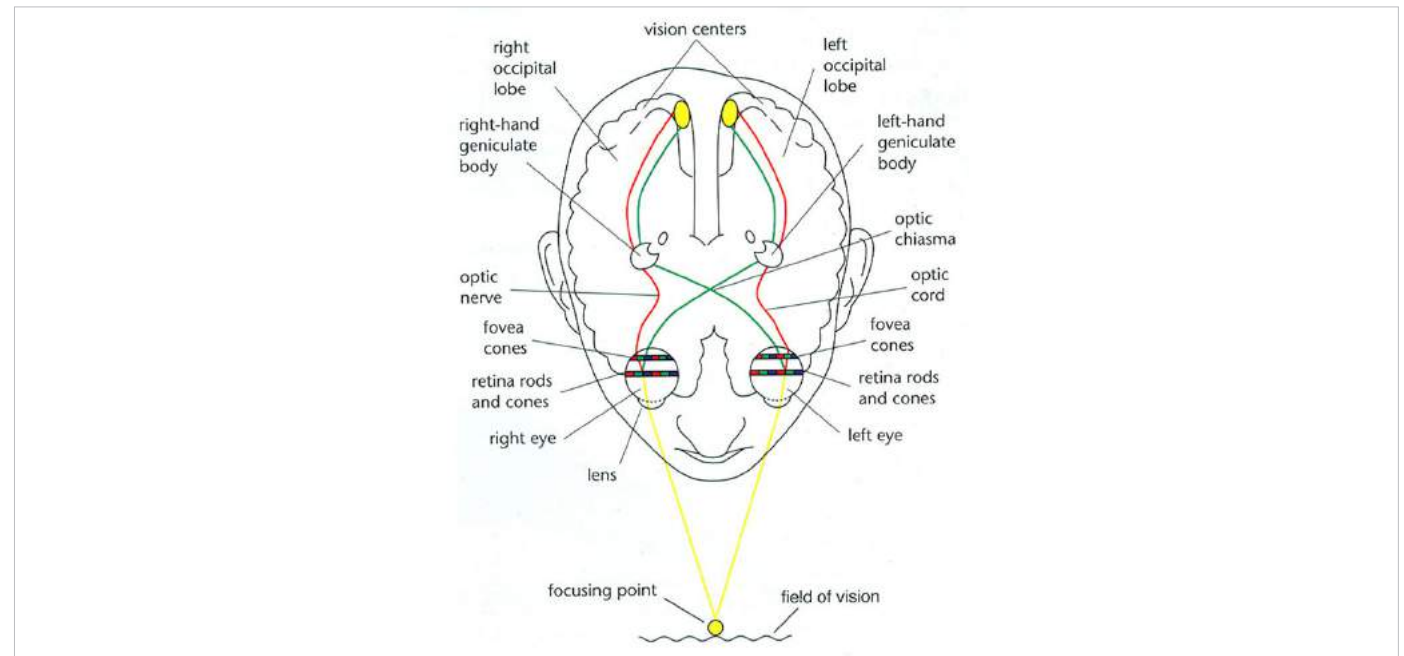
Colour is not just a visual sensation but it is immediately followed by perception. It is the perception that decides and identifies what has been sensed. This can be understood through:

1. The Experience of Colours
2. The Psychology of Colours
3. The Meaning of Colours

The Science of Colour Perception:

Vision is not only a result of the light entering into our eyes but also includes biological functions. The sensation of light is received in two areas of the brain.

1. The cerebral cortex, which is the centre of cognitive activity. Its job is to receive information and process it by recognizing and structuring a response to each stimulus.
2. The hypothalamus or midbrain, which acts as a biological stimulus to the nervous system. The light and colour stimulations trigger the midbrain which in turn releases hormones. Hence, colour stimulus can have a very strong psychological and hence physiological influence on human affecting their needs and emotions.



Source: Feisner E. A., (2006) Colour Studies, Fairchild Publication, Inc. NY.

1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Human eye in combination with the brain's reaction distinguish type of colours, its relative purity and lightness. Humans do not sense the colour spectrum as separate colours but as unbroken band of colours each blending into the next just like in case of a rainbow. 'Threshold' of vision is the point at which one cannot detect difference between two similar colours. The 'interval' is the step of change between sensations and helps characterize differences between colour samples. The ultraviolet and infrared colours lie beyond two ends of visible spectrum beyond the range of human vision. However, certain animals and insects can sense these colours. In addition certain colours are perceived more easily than others. The attached figure shows the perception curve of the visual spectrum. It indicates that yellow and green are seen before other hues while red and violet are difficult to perceive.

Memory, experiences, intelligence and cultural background all affect the way colours impact humans and these impacts vary from person to person. This does not say that the colour will be perceived differently but the perceptions will mean different things to different people [1].

According to Miller [2], it is possible to do a theoretical distinction of three backgrounds for meanings attached to colour:

- An Innate,
- A Personal, and
- A Cultural background.

The first one hypothesizes from anthropological and behavioural research, for several subhuman species colours are very important signals in order to survive and adapt. Humans are also bound to these biological reactions and it is possible that in their evolution the ability to see colour developed because it was essential for their survival too [3].

The second background comes from each of our personal experiences and choices. People are comfortable when colours remind them of similar things. For example, a soft shade of blue triggers associations with the sky and a psychological sense of calm.

The third background implicates culture. We are born and bred in cultures that are full of meaning. Coded meanings of colours are shared connotations of feelings, sensations, atmosphere, thoughts, and moods [4].

It could happen that meanings could vary through historical timeline and different cultures. The vast majority of people are not aware about the effects that colours have on them; neither how this symbolism is used in everyday life and in communication. Some basic colours have had, and still have, symbolic significance in religions. Flags are important examples of abstract colour symbolism.

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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The Experience of Colours:

To perceive colour is to 'experience' it consciously or un-consciously. Mahnke (1996) has systematised the experience of colour through a Colour Experience Pyramid. The different levels of colour experience starting from the base of the pyramid are:

1. Biological Reactions to a Colour Stimulus:

Colour is a gift of evolution and an inherent characteristic of survival.

Eg. Green plants are green because they depend on the pigment chlorophyll for photosynthesis.

2. Collective Unconsciousness:

They are archetypes or original patterns, predispositions for responding to or experiencing our world in the same manner our ancestors did.

3. Conscious Symbolism or Associations:

The impressions and associations made at conscious level- they are learned responses.

Eg. Green with nature, blue with sky or water.

4. Cultural Influences and Mannerisms:

Colour associations that are characteristic of specific cultures and groups or regions and religions.

Eg. Red represents purity in Eastern context while it is associated with aggression and anger in the global West.

5. Influence of Trends, Fashions, Styles:

Colour changes associated with sales and market, to guard against consumer boredom and to celebrate the spirit of a particular time. Though temporary, the colour trends are also overall way in which we experience colour.

6. Personal Relationship:

An individual responses with respect to likes and dislikes towards a particular colour(s). Personal relationship to colour and its significance can only be truly investigated through psychodiagnostic colour tests.

1. Introduction

2. Visual Design

3. The Science of Colour

4. **Colour Perception and Human Responses**

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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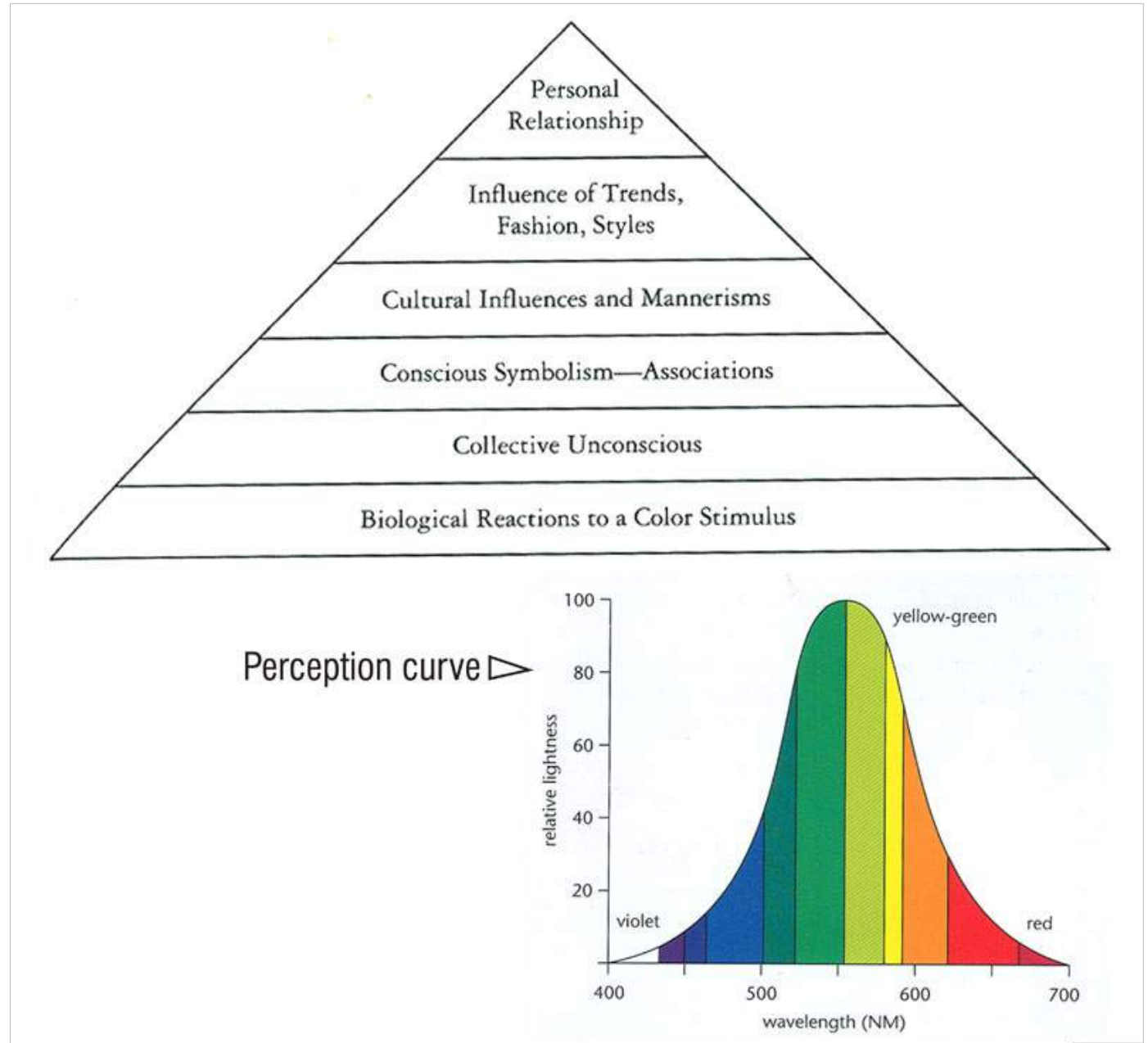
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1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



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The Psychology of Colours:

Light and colours are also involved in psychological theories. Valuable information about emotional content of colours is available from a series of psychological experiments and tests. Rorschach developed a psychological test in which colours are an important issue, commonly known as inkblots test. He stated colours remit to emotions, and a more responsive behaviour towards colours indicates a greater affectivity. Jung suggested chromatic experience as different ways of perception and expression, and stated an equivalency between colours and feelings. Psychological effects of colours or colour psychology is a vast and complex field beyond the scope of this section.

Our reactions to colours can also be used as diagnostic tools for some therapies. Experiments have shown that people placed within a red environment are energized and seem mentally alert and creative. A pink environment has a calming effect but still allows creativity to be highlighted. Yellow and orange will activate and increase energy levels. It has been shown that blood pressure is elevated by experiencing red, orange or yellow environments. Blood pressure decreases when people are in green, blue or black environment.

Some psychologists believe that analyzing an individual's use of and responses to colour can reveal information about his/her physiological and psychological condition. It is even been suggested that specific colours can have a therapeutic effect on physical and mental disabilities. Dyslexic children have been helped in their reading by placing a coloured transparent sheet over the stark black and white page. Phototherapy is a therapy used for depression diagnosis; the patient is exposed to a potent source of light in order to make him/her feel better. It has been proved regions with long non-light periods have higher records of emotional disorders and suicides. Moreover, IQ testing also provides us with some interesting colour effects. Testing results are higher when the subject is placed in yellow, yellow-green, orange or light valued blue room. Lower IQ results were recorded when subjects were in white, brown or black surroundings. Medical field known as chromotherapy is use of healing with colour, be it coloured light, environment or mental exercised that involve concentrating on particular colours. However, the role of colour in medicine has been controversial over ages [5].

Colours may evoke associations with odour and taste, appear heavy or light, appear near or distant, be associated with sound, volume and temperatures. These associations play an important role in the design of the built environment, advertising, product colour and display – in short anything where colour is used to inform and communicate.

Mahnke (1996) again gives the following association with colours with perception of volume, weight, size, temperature, noise, sound, odour, taste and tactile associations.

1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Perception of Volume:

Lightness or darkness of colour in interior spaces plays a very important role in the perception its overall volume. Light or pale colours recede or increase room size while dark or saturated hues seem to decrease the apparent size of the same room. Similarly, a highly illuminated room will have an enlarged appearance of volume while a dim or low illumination seems to diminish it.

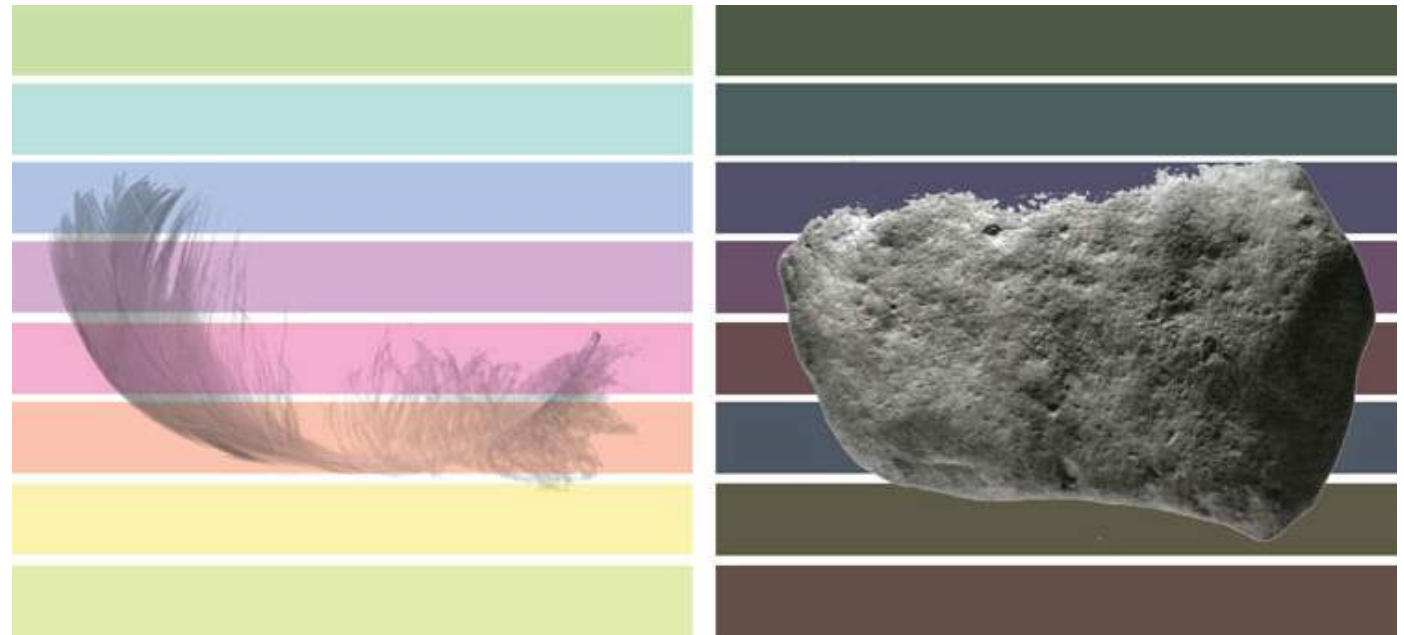
Perception of Weight and Size:

Darker colour appears heavier while lighter colours seem less dense.

Eg. A piece of heavy machinery painted dark green will seem shaky if it rests on yellow feet.

Cool colours make objects appear shorter and smaller while warm colours make them longer and larger.

Eg. Heavy objects designed to be moved or carried by human may be made to appear less heavy by painting it with lighter, cooler colours. In interior spaces, low ceiling may be painted lighter to make them appear higher.



Perception of Temperature:

Colours that are considered warm are red, orange, yellow while cool colours are shades of blue and green. There are a number of accepted medical theories proving the perception of temperature with respect to colours.

Eg. Because red is the nearest hue to infrared heat (it is the longest wavelength) it imparts a physical sensation of warmth.

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Colours absorb and retain heat in various degrees. In hot climate the terrace floorings are whitewashed or use white china mosaic to reflect heat and keep temperatures inside the room lower.



Perception of Noise and Sound:

Brightness and loudness are associated with effects of warm colours and vice versa.

Eg. Loud red or soothing blue.

Heinrich Frieling, director of Institute of colour Psychology, based on his research assigns the following sound associations to various colours. A few examples are as follows:

- Red: Loud, trumpet
- Pink: Soft, delicate
- Yellow: Shrill, major key
- Green: Muffled (when dull), shrill (when saturated)
- Blue: Distant, flute to violin.



1. Introduction

2. Visual Design

3. The Science of Colour

4. Colour Perception and Human Responses

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Associations of Odour and Taste:

Colours that hold pleasant associations with smell are pink, lavender, pale yellow and green. Tints of coral, peach, soft yellow, light green have pleasant associations with taste.

“Color and the appeal of various foods is also closely related. Just the sight of food fires neurons in the hypothalamus. Subjects presented food to eat in the dark reported a critically missing element for enjoying any cuisine: the appearance of food. For the sighted, the eyes are the first place that must be convinced before a food is even tried. This means that some food products fail in the marketplace not because of bad taste, texture, or smell but because the consumer never got that far”. (Gary Blumenthal International Food Strategies)

The Institute of Colour Psychology under Frieling has also compiled a listing of odour and taste associations:

- Red: Sweet, strong
- Pink: Sweetish, mild
- Yellow: Sour
- Green: Sour, juicy
- Blue: Odourless

Tactile Associations:

Colours can also give an impression of texture or sense of touch.

For Eg. Red appears firm and solid, yellow appears smooth and light while violet has a velvety appearance.

Colour Psychology:

The colour of the food plays a cur tail role in appetite. The lighting in the restaurants as well as the food colour and presentation contributes to its success. Sight is the first to be convinced before the food is even tried!



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Visual Design - Colour Theory

Colours in Visual Design

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1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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Source:

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The Meaning of Colours:

Colour Association:

- RED
- ORANGE
- BLUE
- GREEN

• RED:

Arousing, exiting, stimulating and is associated with strength, passion, activity. Its negative impressions include aggressiveness, fierceness and blood. Red signifies life and living. Red is an auspicious colour for marriage. Brides in India and Nepal wear red saris; in Japan, a red kimono symbolizes happiness and good luck.

It is also a colour of love. It is perhaps the most dominant and dynamic of all colours. The effect of fierce effect of red is drastically changed to gentle when it turns to pink. Red when is used with bright orange loses its meaning.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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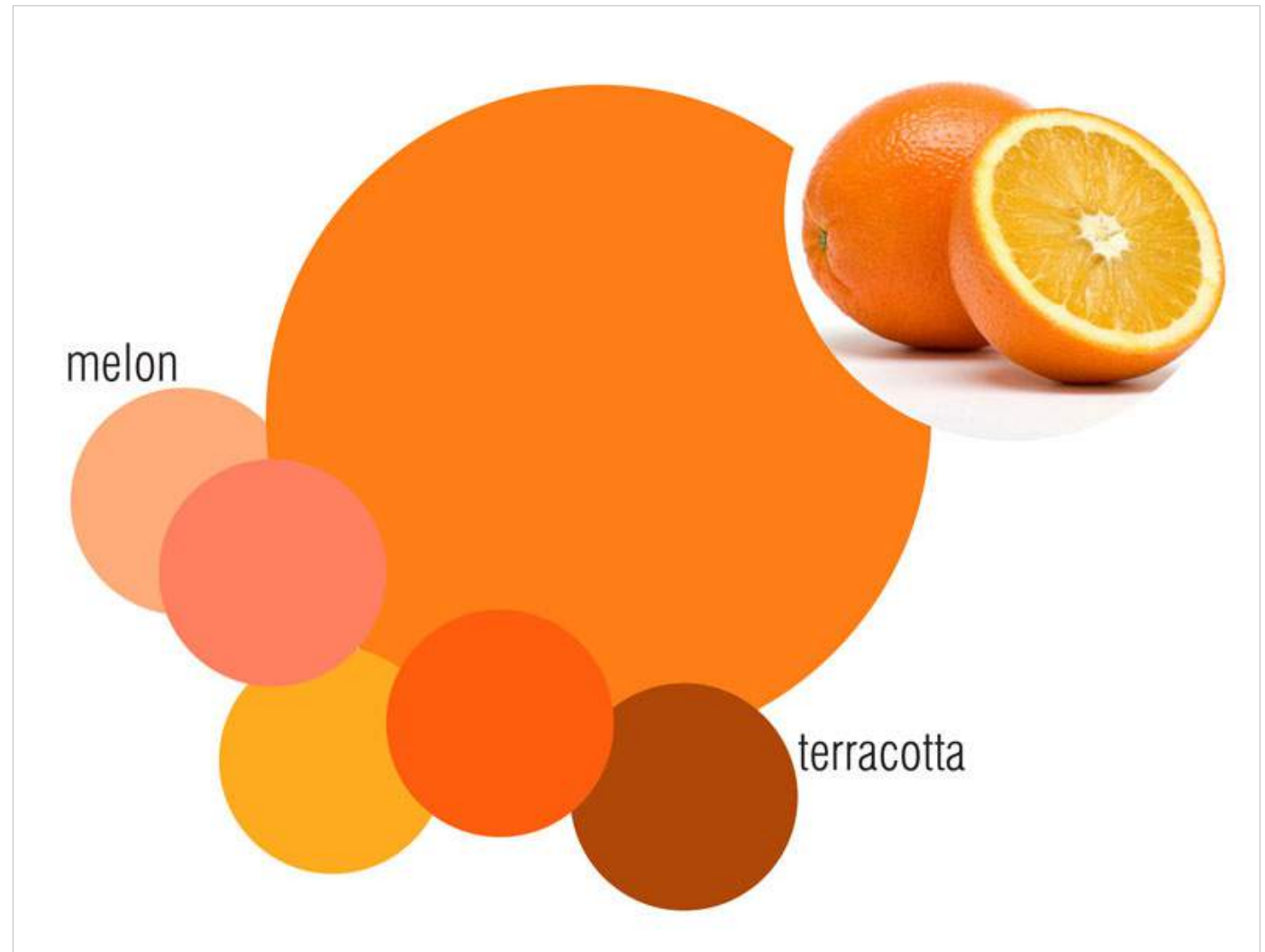
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• ORANGE:

Orange is jovial, vibrant, exiting, extrovert and fruity – but it can be rough, insensitive and can lack identity unlike red. It is a symbol of autumn. Orange (saffron) is a sacred and auspicious colour for Indians while it is the colour of prison uniforms in the U.S. Research has shown that orange in supermarkets represents 'cheap' value for money. Bright 'safety orange' is also used to attract attention like red. Different oranges have different effects and associations. Brown is a darkened orange which is linked with comfort and security, bright orange can be spicy, and terracotta is earthy while lighter oranges are soothing and healthy.



1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

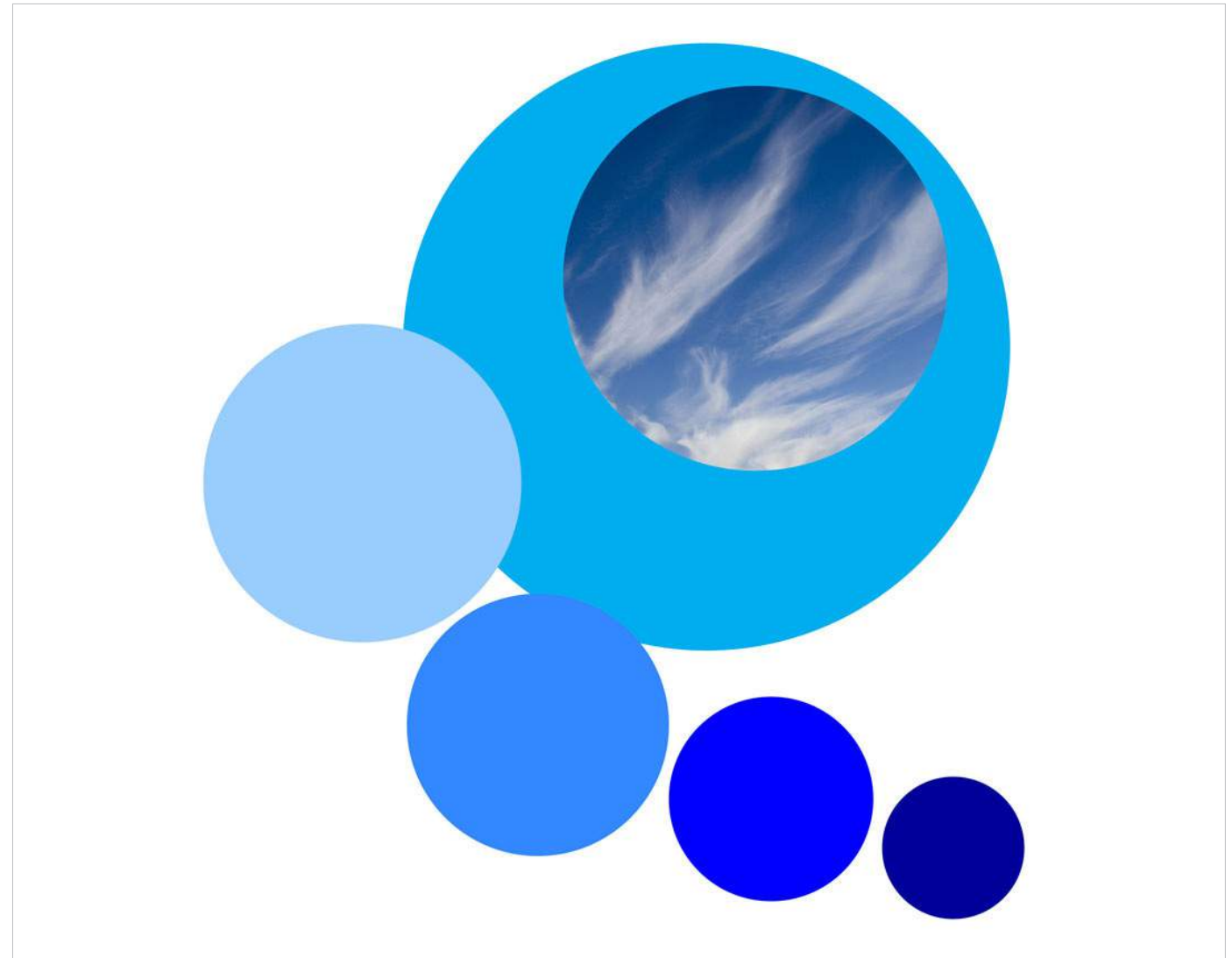
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• BLUE:

Blue is rarely disliked by people and gives a relaxing and calming impression. Its positive associations are calmness, comfort, peace, cleanliness, spirituality, coolness and infinity while its negative associations are frightening, depressing and cold. Blue convey different meanings in different cultures – in English to 'feel blue' is to feel low while that in German is to be drunk and in Russian means to be homosexual. Blue is associated with baby girl in Belgium as opposed to rest of the world.



1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

Ms. Shruti Hemani and Prof. Ravi Mokashi Punekar
DoD, IIT Guwahati

Source:

<http://www.dsource.in/course/visual-design-colour-theory/colour-perception-and-human-responses>

• **YELLOW:**

Yellow is reflective and luminous and happiest (cheerful and high-spirited) among all colours. It's the colour that captures our attention more than any other colour. In almost all cultures it symbolizes bright future, optimism and hope. The human eye processes yellow first and hence it is used for cautionary signs and emergency vehicles.



1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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DoD, IIT Guwahati

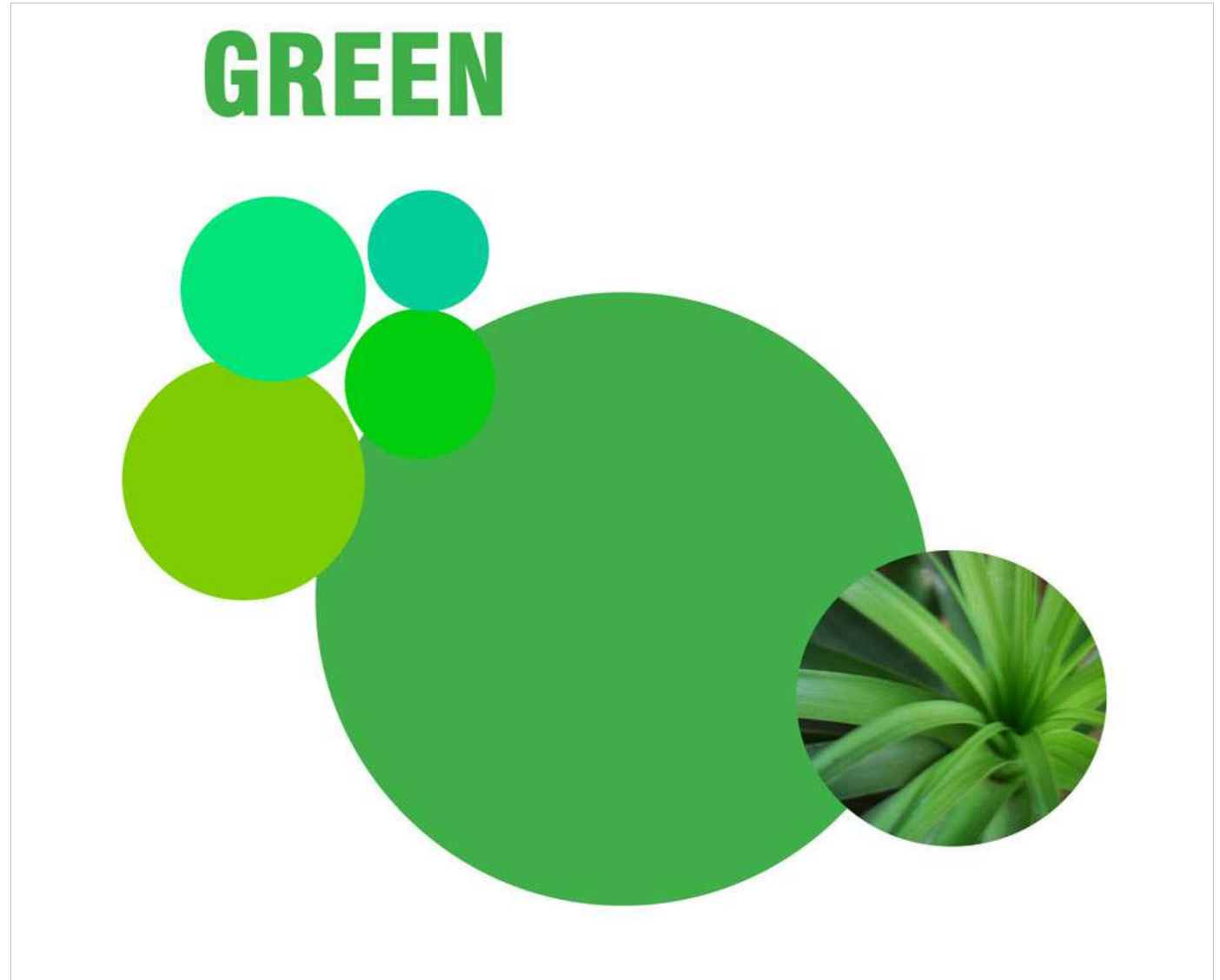
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1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

• GREEN:

Green is a global symbol of ecology and environment; it is holy in Muslim culture and lucky colour in Ireland. It is universally associated with nature and traffic lights are green all over the world. Negative association of green is decay and sickness. Most people associate poison with green. Neutral green is calming but when it moves towards yellow in the colour spectrum it becomes stimulating while towards blue it turns cooler.



Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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<http://www.dsource.in/course/visual-design-colour-theory/colour-perception-and-human-responses>

1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Colour Symbolism:

Yellow is a cheerful and bright colour. In its purest form, it has associations with nature, childhood, the sun and happiness. However, add red to it and you start to move towards autumnal feelings. Add green to it and it gets associated with disease and illness. When coupled with black, yellow is the highest contrast colour, which is why you see it on so many warning signs, airport signage, and so many other signage systems. We are, of course, just copying nature here, bees and wasps use these colours to great effect.



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Visual Design - Colour Theory

Colours in Visual Design

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<http://www.dsource.in/course/visual-design-colour-theory/colour-perception-and-human-responses>

A colour that isn't really a colour. Black is the absence of colour. In the West, it's associated with death and mourning, but also has an authoritative, official feel. It can sometimes be used in branding to give a sense of style; a classy touch. In this sense, black can suggest wealth and opulence.



Flags are the most obvious examples of abstract colour symbolism.

1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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<http://www.dsource.in/course/visual-design-colour-theory/colour-perception-and-human-responses>

1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



The symbolic meaning of colour varies with TIME and CULTURE.

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It is now clear from the chapter 'the Science of Colours' that in the physical world, there are no colours. Colours are light waves of different wavelengths that are reflected from objects and the human eyes have the ability to sense and perceive such bands of wavelengths as different colours. Seeing colours is therefore, is ones one perception and experience which can be affected by various factors such as individual personality, mood, emotions, personal experiences, age, gender, social and cultural backgrounds. This is why different colours mean and feel differently to different people. Moreover, the meaning of colours is not same across different cultures and period of time. The meanings of colours and their symbolism in a particular society is formed by the myth, value, belief, religion, customs and taboos as well as regional and historic background of that particular society. For eg. The Christian bride wears white for the wedding symbolising purity while a Hindu widow wears white as it symbolises mourning.

The meanings associated with colours may be universal and timeless but not always. For example, the fact that green is the colour of vegetation and that blue is the colour of the sky and water has been a reality that is common to all people. However, colour symbolism that arises from cultural and contemporary contexts are not universal and may be unrelated to its natural associations. These may also change through time. Colour changes are said to reflect the ideas, philosophy, moods and trends prevalent in that particular era as well as the economic and social change. For example in the 1960s, psychedelic colours were popular since it echoed the optimistic spirit of that era. Furthermore, a colour may have both positive and negative symbolism. For example black's positive connotations include sophistication, luxury, and power while its negative connotations are death, depression, bad luck. On one hand, red is a colour of fire, energy and aggression (in the global west) while in direct contrast, red is used for "STOP" signs throughout the world today.

Although there are no absolutes, there are logical sources for the range of complex and sometimes contradictory psychological/cultural meanings of colours. These may arise from any of the following [6]:

1. Cultural associations: the colour of currency, traditions, celebrations, geography, etc.
2. Political and historical associations: the colour of flags, political parties, royalty, etc.
3. Religious and mythical associations: the colours associated with spiritual or magical beliefs
4. Linguistic associations: colour terminology within individual languages
5. Contemporary usage and fads: current colour applications to objects, sports, and associations generated by modern conventions and trends.

Colour psychology analyses the effect of colour on human behaviour and emotions. It can also influence the subjective appreciation of the quality of goods or the perception of an advertising message. Hence designers and marketers can use colour psychology to add value to the products and services and to increase sales. There are numerous examples that colour psychology can be applied to interior, product, fashion and textiles design in numbers of ways that achieve favourable result [7].

1. Introduction
2. Visual Design
3. The Science of Colour
4. **Colour Perception and Human Responses**
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

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by

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The understanding and application of colour psychology is made complicated by the different symbolic meanings of colours in different culture.

[1] Feisner E. A., (2006) Colour Studies, Fairchild Publication, Inc. NY.

[2] Miller, H. Experience of Colour, <http://www.hermanmiller.com/>

[3] Mahnke, F.H., (1996) Colour, environment and Human Response. An Interdisciplinary Understanding of Colour and its Use as a Beneficial Element in the Design of the Architectural Environment, Van Nostrand Reinhold, NY.

[4] Zammitto V.L., The expressions of Colours, summit.sfu.ca

[5] Feisner, A. (2006), Colour: how to use colour in art and design, Laurence King Publishing.

[6] Morton, J. <http://www.colormatters.com>

[7] Wong, B., Colour Psychology in Design, www.shine-21.com

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1. Introduction

2. Visual Design

3. The Science of Colour

4. **Colour Perception and Human Responses**

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

Ms. Shruti Hemani and Prof. Ravi Mokashi Punekar
DoD, IIT Guwahati

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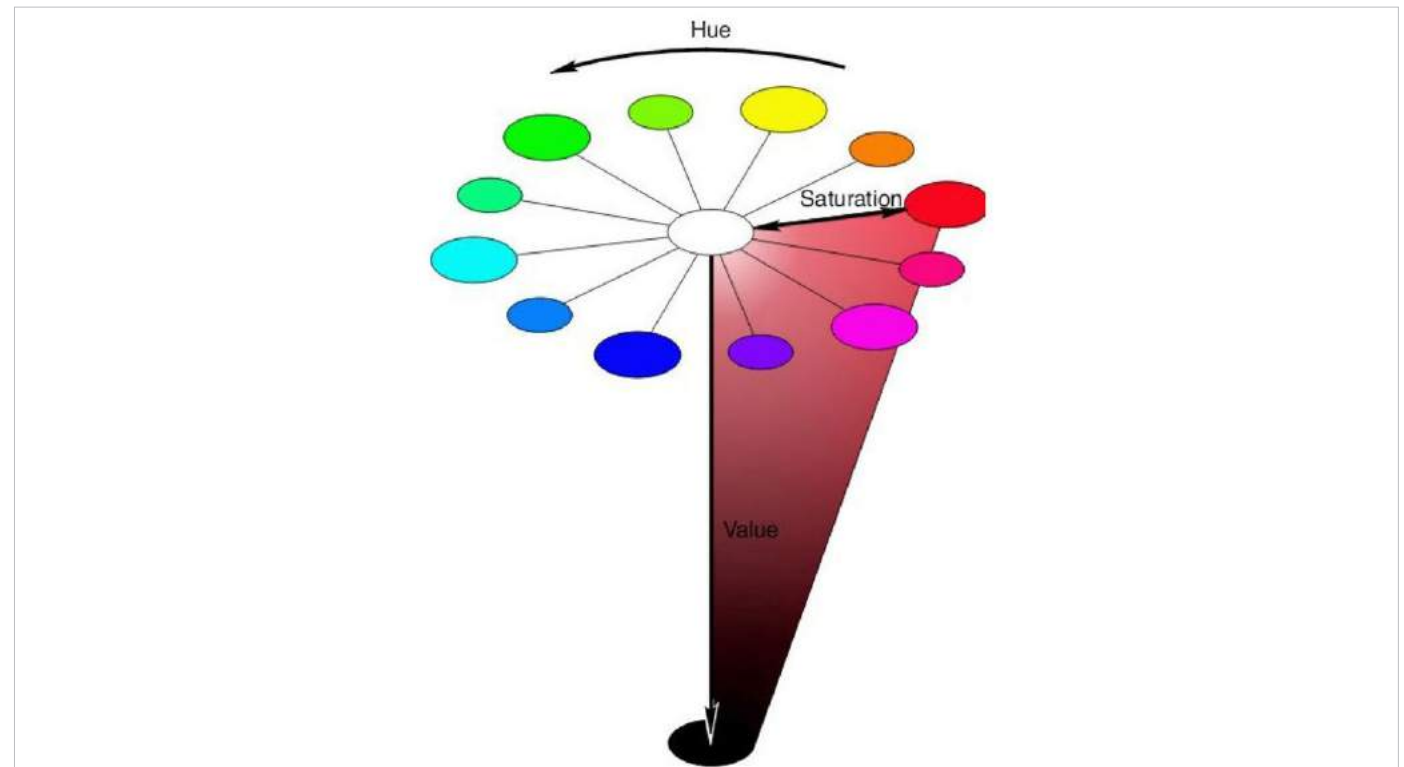
Colour Description and Colour Theories

It is important to understand the key terminologies and theories associated with describing and understanding colours.

Colour Description:

To give a precise description of a colour can be difficult and frustrating. A yellow can be dark-yellow or light-yellow, bright or dull yellow, lemon-yellow or melon-yellow. Colour has four distinct properties: hue, value, saturation. To understand colour you must understand how these four properties relate to each other.

- **Hue:** The name of the colour
- **Value:** The lightness or darkness of hue
- **Saturation or intensity (chroma):** The purity of hue, brightness or dullness
- **Temperature:** The warmth and coolness of hue



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

Ms. Shruti Hemani and Prof. Ravi Mokashi Punekar
DoD, IIT Guwahati

Source:

<http://www.dsource.in/course/visual-design-colour-theory/colour-description-and-colour-theories>

Hue:

A hue name is the name of the colour which is used to describe a particular wavelength. The average person can distinguish about 150 colors (hues) of light and every one can be described using one or two of only six words- Red, orange, yellow, green, blue, violet. A colour is usually called by the name of its most obvious, or dominant, hue. A hue without any white, black, grey or complementary in it is called a pure hue. Different hues can be obtained by mixing two primaries, two adjacent colours or two complementary colours in equal or unequal proportions.

- Chromatic: Having hue
- Achromatic: Without hue
- Polychromatic: Having many hues
- Monochromatic: Having one hue only

Value:

Value is concerned with the light and dark properties of colour. All colours exhibit these properties. The hues have a natural value where they look the purest. Some colours, like yellow, are naturally light. Some, like violet, are darker. All hues can be made in all values. Adding white paint will make any pigment lighter. Adding black paint will make most pigments darker, but will cause yellow paint to shift in hue to green. Value can exist without hue (see achromatic). Black, white and gray are values without colour. White is the highest possible value while black is the lowest. Gray as the midpoint between black and white, is a medium value, neither dark nor light.



1. Introduction

2. Visual Design

3. The Science of Colour

4. Colour Perception and Human Responses

5. **Colour Description and Colour Theories**

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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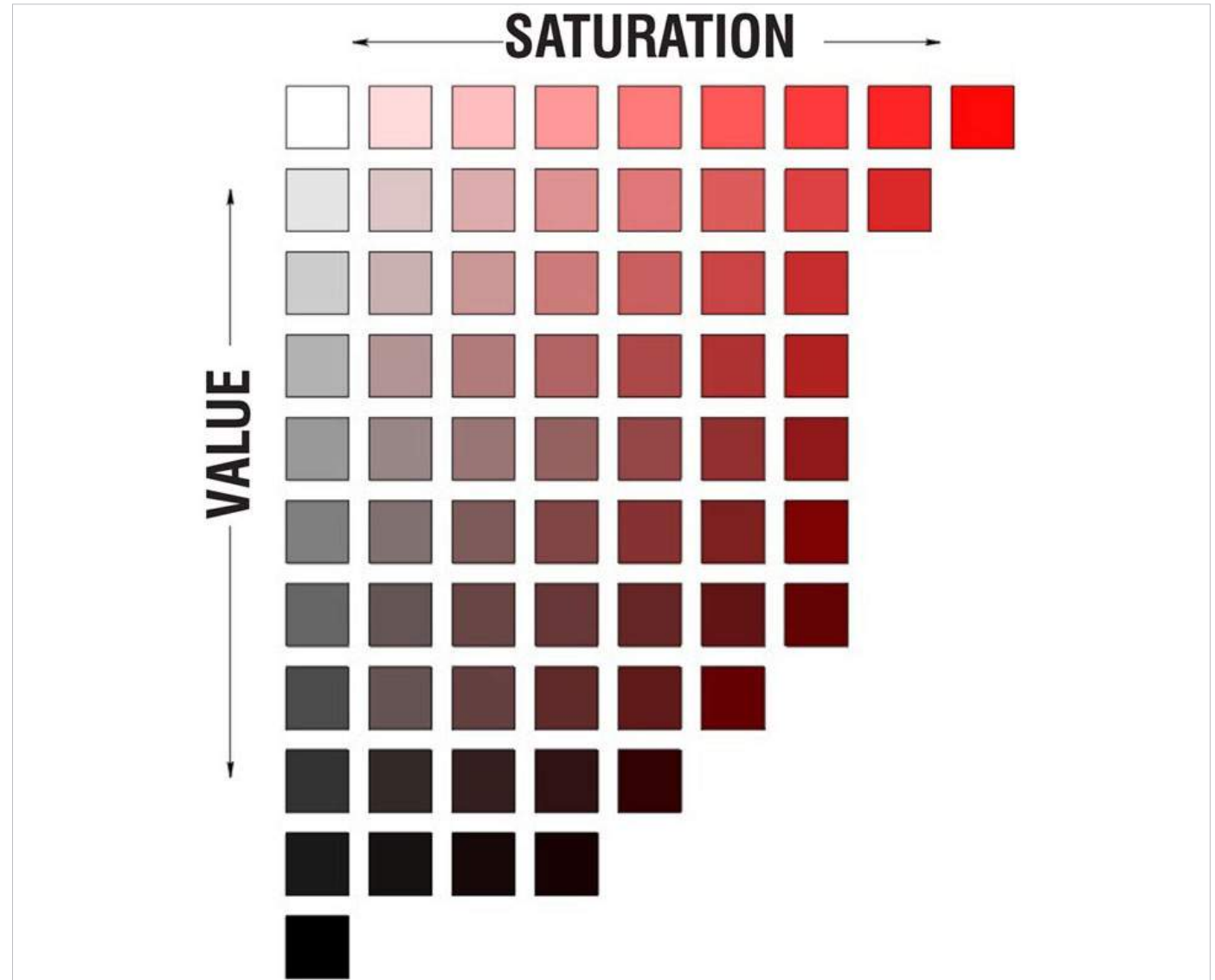
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Saturation:

The third descriptive quality of colour is saturation, or chroma or intensity. It defines the degree of purity of a hue or the contrast between dull and vivid. Saturation is a comparative property and like value is linear and progressive. The beginning of a saturation scale is a colour that is hue-intense. The end step is a colour so muted that its hue can just be identified.



Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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DoD, IIT Guwahati

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<http://www.dsource.in/course/visual-design-colour-theory/colour-description-and-colour-theories>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Temperature:

The temperature of a colour is its relative warmth or coolness. Cool and warm are two opposing qualities of hue. Cool colours contain blue or green: blues, greens, violets, and steps between them. Warm colours are reds, oranges, yellow, and steps between them. Colour temperatures affect us both psychologically and perceptually. They help determine how objects appear positioned in space. Warm colours are said to advance (they appear closer to the observer). Cool colours tend to recede (they appear farther from the observer).

Tints, Shades & Tones:

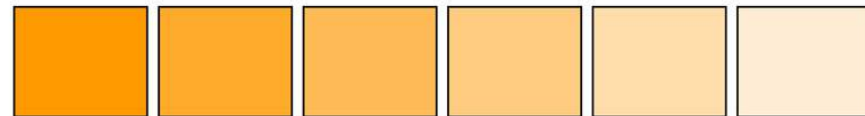
• Tints and Shades:

Pure hues are often diluted to change their value to make them lighter or darker. A tint is a hue that has been made lighter (by adding white). A shade is a hue that has been made darker (by adding black). Tinting a colour retain the hue while making it more light-reflecting. In contrast, shades reduce hue experiences. Black absorbs all wavelengths of light and hence, reduces light reflectance, dull and muted.

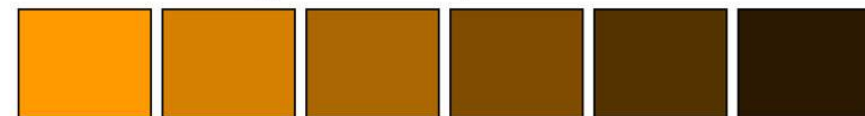
• Tones:

There is no really satisfactory definition for “tone.” It is defined as “pure color diluted by black or white,” which we know as a tint or shade. A second definition states that tone is “one hue modified by another”(as in “this is a blue tone that is a greener one”). The third meaning is given as “a hue muted by gray.” Each definition means a modification of hue, but each means a different kind of modification of hue. The first means dilution by changing value, the second means dilution by changing hue, the third dilution by adding gray.

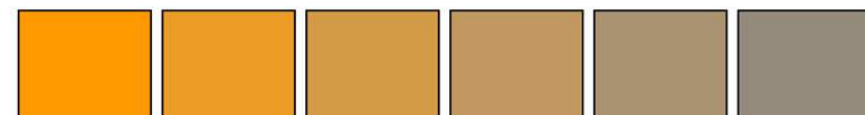
TINT - adding white to a pure hue



SHADE - adding black to a pure hue



STONE - adding gray to a pure hue



Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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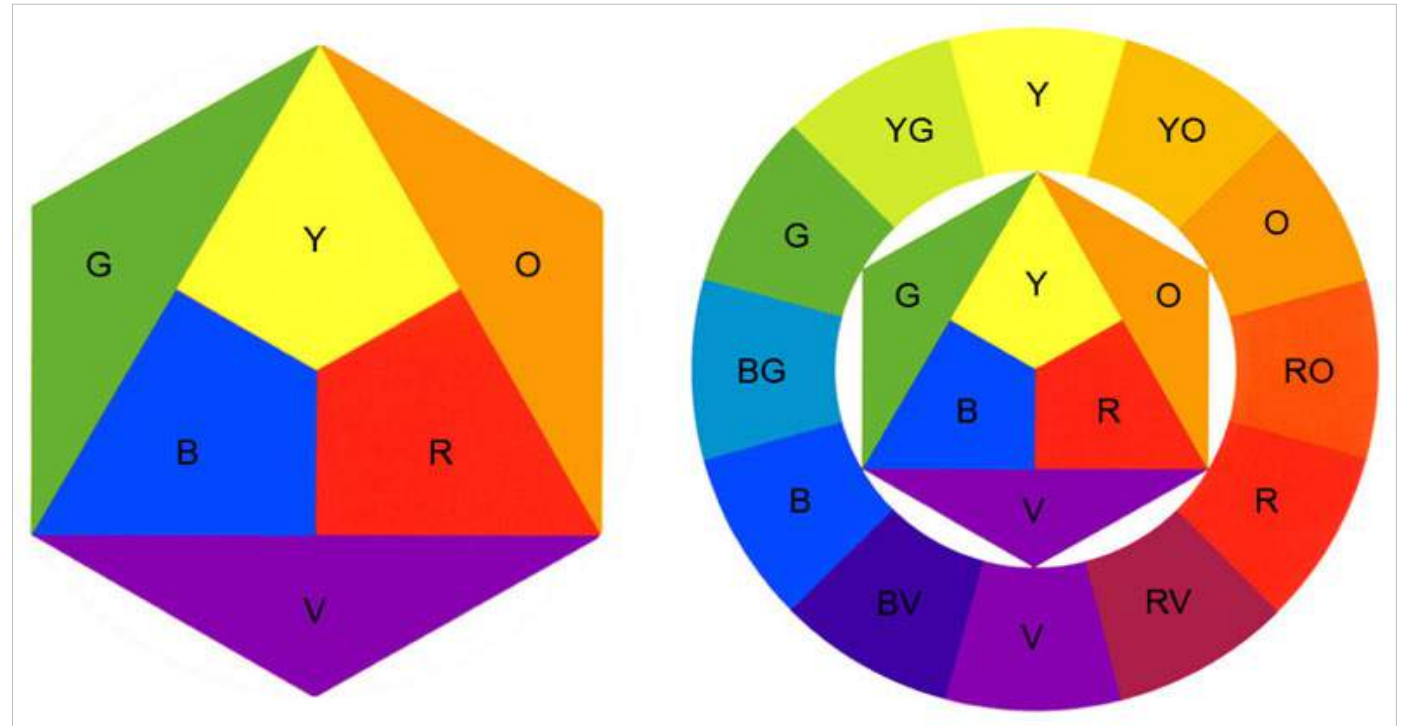
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<http://www.dsource.in/course/visual-design-colour-theory/colour-description-and-colour-theories>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Primary, Secondary, Tertiary:

- Primary colours : Colours that cannot be obtained by mixture of other colours.
- Secondary colours : Colours obtained by mixture of two primaries.
- Tertiary colours : Tones formed by mixture of a primary and a secondary colour.
- Analogous : One primary colour and the two tertiary colours on each side.
- Triadic : Three equidistant colours on the wheel.



Complementary:

- Complementary colours: Colours directly opposite to each other in a colour wheel and appear opposite in character are called complementary colours.
Eg. red-gree, orange-blue, yellow-violet.
- Direct complements: Are colours that are directly opposite each other on the colour wheel.
- Split complements: A colour and the two colours adjacent to it's direct complement.

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Visual Design - Colour Theory

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Source:

<http://www.dsource.in/course/visual-design-colour-theory/colour-description-and-colour-theories>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Chromatic, Achromatic, Monochromatic, Neutral:

- Chromatic Colours: any colours other than white, grey and black.
- Achromatic Colours: Black, white and grey colours
- Monochromatic: Many values of a single colour
- Neutral colours: Colours obtained by mixing complementaries. Mixture of chromatic and achromatic colour will partially neutralize the resultant colour.

Colour Systems:

Colours can be mixed according to three different systems:

- Subtractive Colour System : Process of mixing pigments
- Additive Colour System : The process of mixing coloured lights
- Partitive Colour System : Based on viewers reaction to colours when they are seen in relation to other colours.

Colour Mixing:

Subtractive Mixing is the process of mixing pigments together as seen in paintings. This became an established fact in the printing and photographic industry, as well as in the craft of mixing paints and pigments in the beginning of the 20th century. Subtractive colour systems start with light- white light. Colored dyes and filters between the viewer and the light source or reflective surface subtract wavelengths from the light, giving it colour. Yellow, Magenta and Cyan when mixed in various proportions, offer the largest possible subtractive colour range. Hence they are subtractive primaries. The secondary colours red, green and blue result from mixing two subtractive primaries in proper proportions, while black or at least a dark grey result from mixing proper proportions of all three of them.

The CMYK colour model is a subtractive colour model, used in colour printing, and is also used to describe the printing process itself. CMYK refers to the four inks used in some colour printing: cyan, magenta, yellow, and key (black). When two RGB colours are mixed equally they produce the colours of the CMYK model. Green and blue creates cyan (C), red and blue creates magenta (M), and red and green creates yellow (Y). Black is added to the model because it cannot be created with the 3 subtractive primaries. The K, or “key,” stands for black.

Additive colour mixing is the process of mixing coloured light, such as in theatres and televisions. Red, Green, Blue when mixed in various intensities, offer the largest possible additive colour range. Hence, these are the additive primaries. The secondary colours yellow, magenta and cyan result from mixing two additive primaries in proper intensities, while white results from mixing proper intensities of all three.

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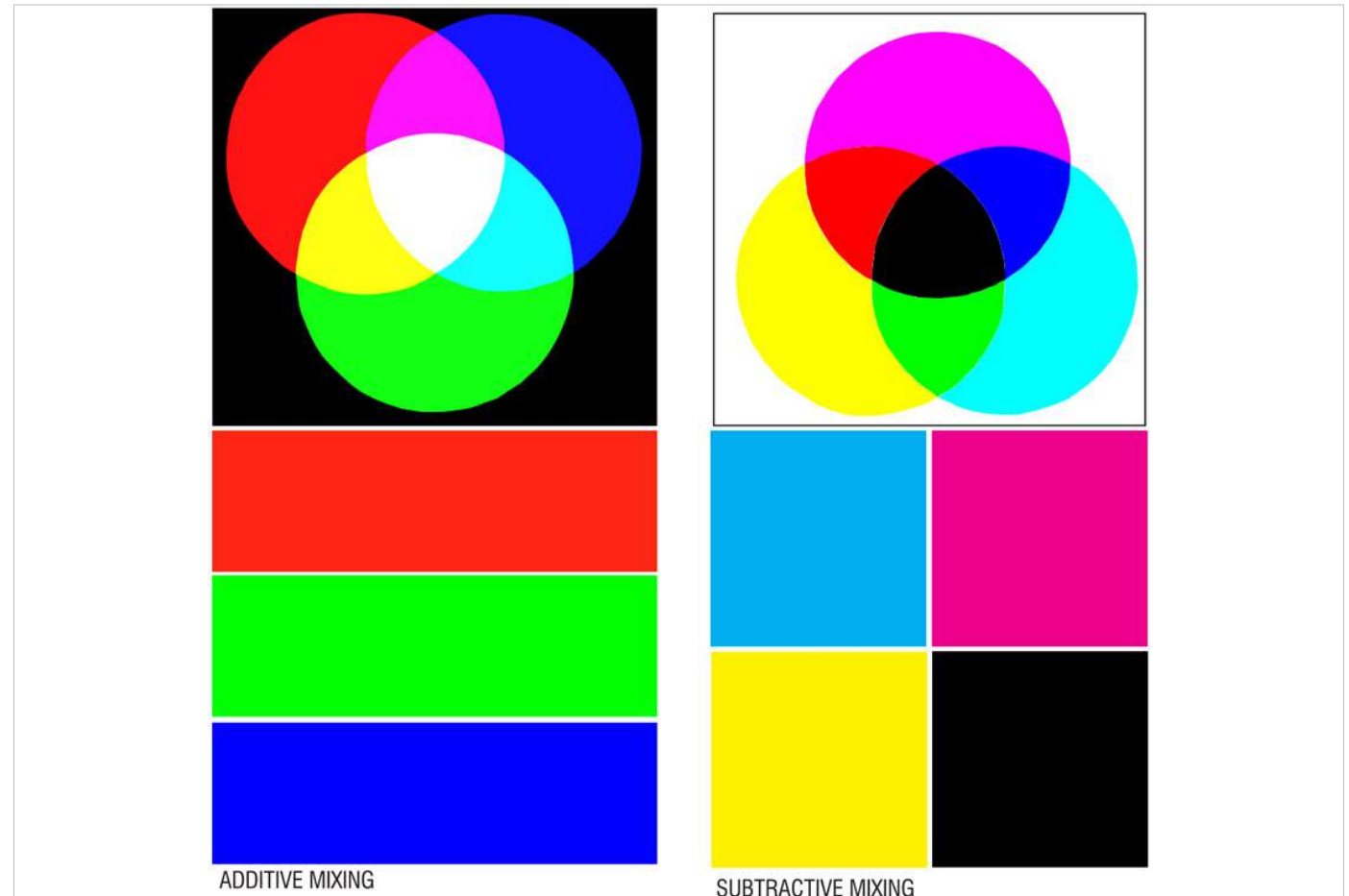
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

The RGB colour model is an additive colour model in which red, green, and blue light is added together in various ways to reproduce a broad array of colours. The main purpose of the RGB colour model is for the sensing, representation, and display of images in electronic systems, such as televisions and computers, though it has also been used in conventional photography. Additive colour mixtures were discovered in 1860 by Maxwell. Before the electronic age, the RGB colour model already had a solid theory behind it, based in human perception of colours.



Colour wheels, charts, tables, bars, etc allow us to organize different colours and predict the interactions between them. Among these, colour wheel remains the most common and convenient method for visually understanding and comparing the relationships of different hues. Colour circles have been used to describe associations of colours from ancient times, but the first known example of the representation of hue in the form of a wheel was designed by Sir Isaac Newton in 1666.

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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

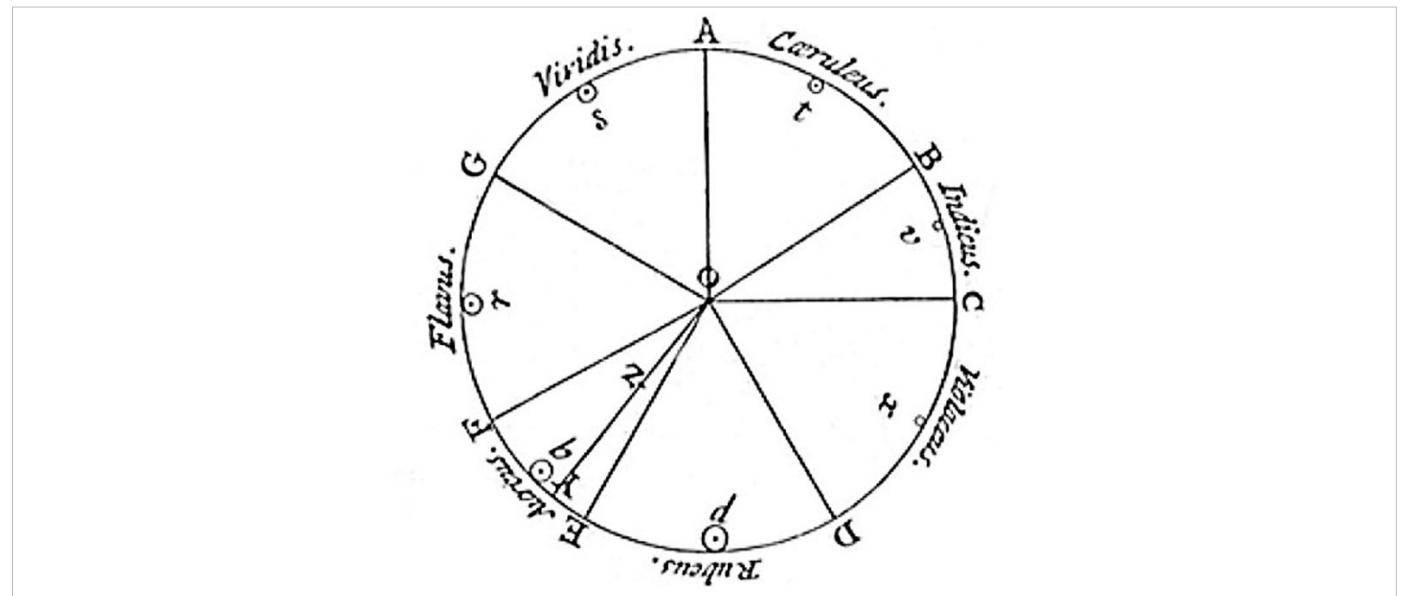
History of Colour Wheel:

Newton took the bar of colours created by the passage of light through a prism and transformed it into a segmented circle, where the size of each segment differed according to his calculations of its wavelength and of its corresponding width in the spectrum. The placement and size of the coloured sections of Newton's circle suggested other mathematical and harmonic relationships.

Goethe's 'Theory of Colours' in the early 19th century provided the first systematic study that focused on the physiological effects of colour rather than the effect of light. His two-dimensional wheel was based on triad of primaries – red, yellow and blue – with secondaries as the compliments of the primaries. Goethe formulated a colour triangle.

Runge published the book 'the Colour sphere' in 1810, in which he arranged 12 hues in a spherical format, giving us the first three dimensional colour model. His primaries were red, yellow and blue.

Munsell developed a colour system in 1905 'Colour Notation', adopted by the United States Bureau of Standards as the acceptable language of colour. He stated that colour could be described according to three variables – hue, value and chroma. Munsell's three-dimensional colour tree, hues are positioned on a vertical axis from light (top) to dark (bottom). Saturation was measured on a horizontal axis with dull-grey hues at the centre turning brighter towards the outer edges [1].



Newtons Colour Circle.

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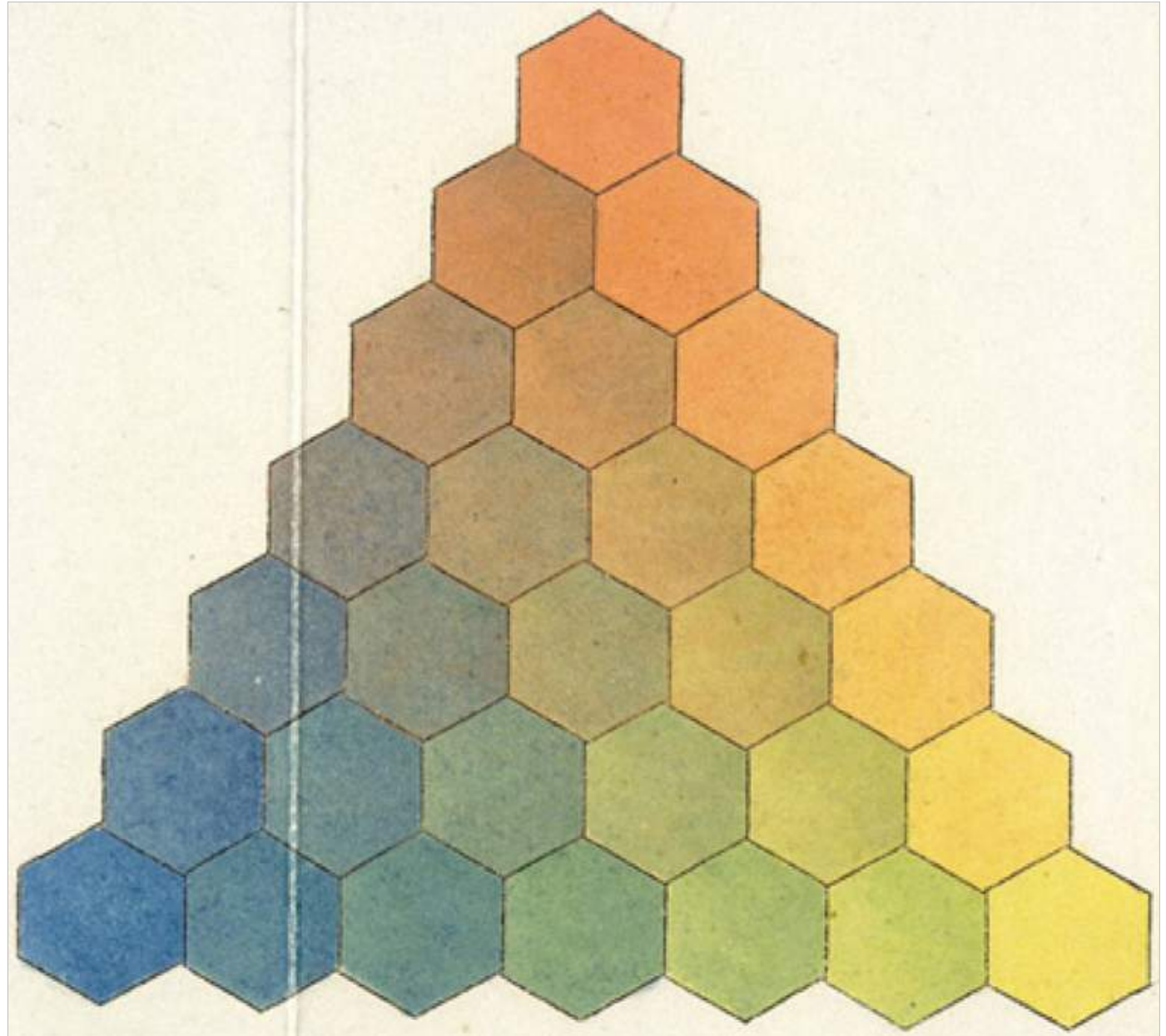
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



Mayer's Color Triangle: Lichtenberg's replication of Tobias Mayer's triangle has only seven chambers per side, rather than Mayer's.

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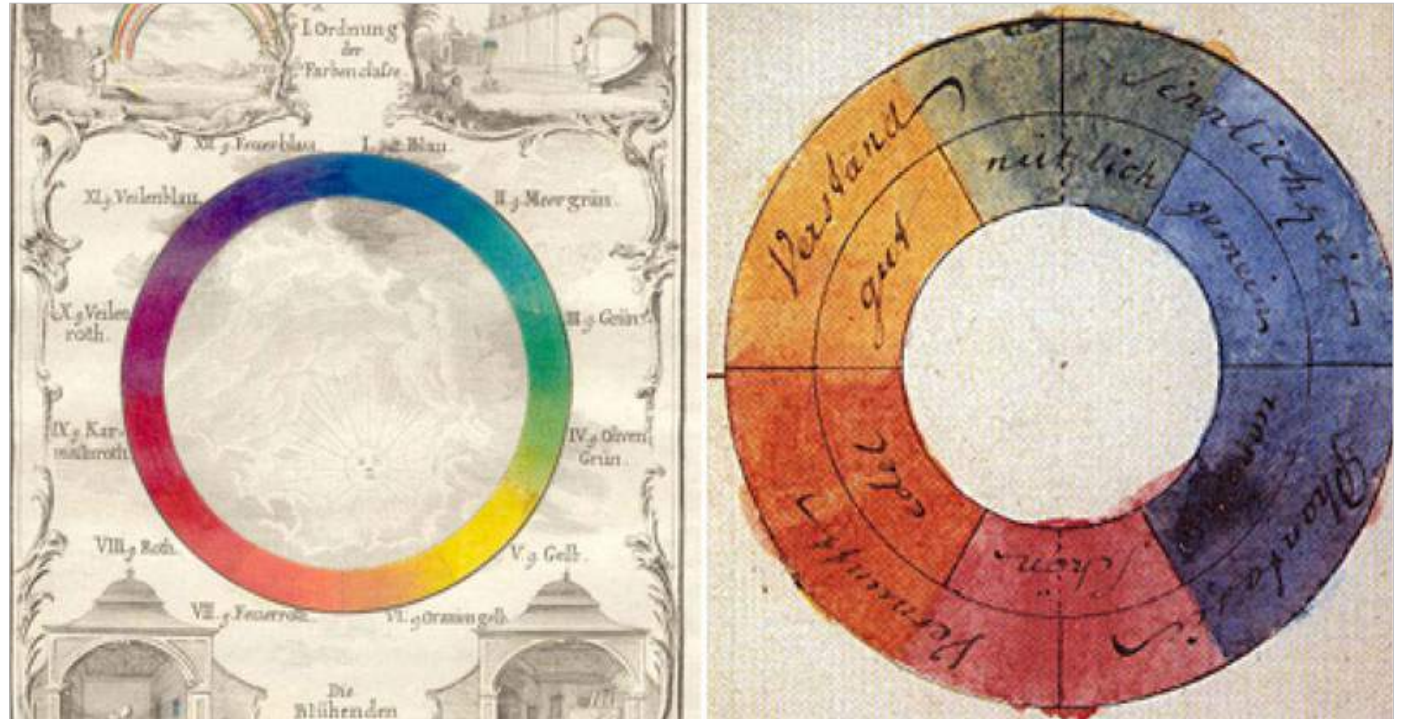
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<http://www.colourlovers.com>



Ignaz Schiffermüller, 1772 & Goethe, 1810.

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

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Types of Colour Wheel:

The colour wheel is a visual representation of colour theory. The different types of colour wheels are:

- The Pigment Wheel
- The Process Wheel
- The Munsell Wheel

• The Pigment Wheel:

The pigment wheel works with subtractive colours and gives information about the colour reactions when they are actually mixed.

. Primary Colours:

A primary colour is the simplest hues and as the name suggests cannot be obtained by mixing. The primary colours are:

- Red
- Yellow
- Blue

. Secondary Colours:

A secondary colour is an even interval between two primary parents. Each is the visual midpoint between two primary colours. The secondary colours are:

- Red + Yellow = Orange
- Yellow + Blue = Green
- Blue + Red = Violet

. Tertiary Colours:

A Tertiary colour is created by mixing a primary colour and an adjacent secondary. It has no single hue apparent or dominating. A colour that has been dulled slightly by addition of its complement is a muted hue not a tertiary colour.

- Red + orange = Red-orange
- Orange + Yellow = Yellow-orange
- Yellow + Green = Yellow-green
- Green + Blue = Blue-green
- Blue + Violet = Blue-violet
- Violet + Red = Red-violet.

1. Introduction

2. Visual Design

3. The Science of Colour

4. Colour Perception and Human Responses

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

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Visual Design - Colour Theory

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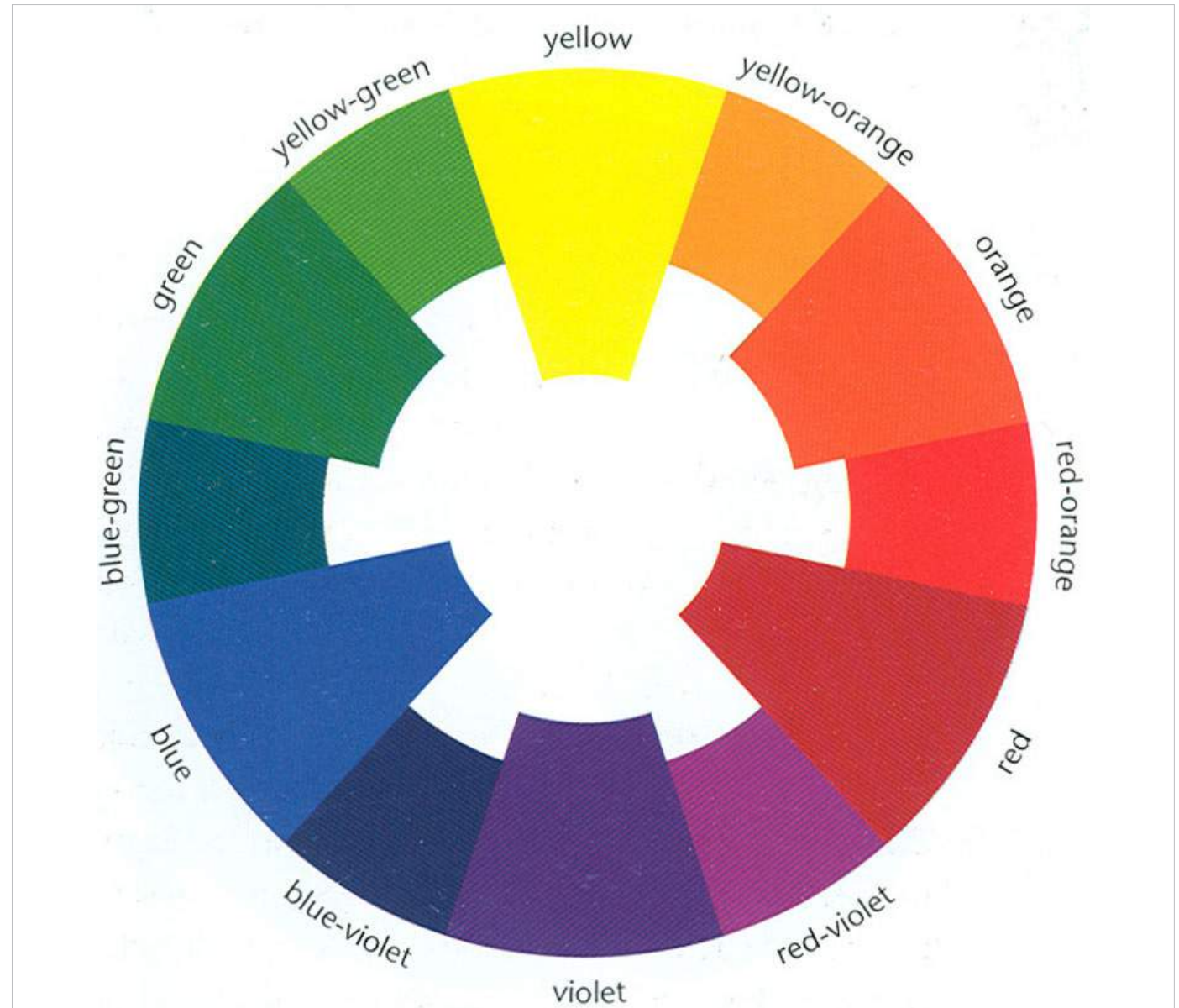
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When the three primary pigments of this wheel are combined muddy black is obtained. Moreover, secondary and tertiary hues are not equal mixtures of their components. Mixing equal amounts of yellow and blue pigments will produce green that is more yellow-green as yellow is stronger than green.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

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• The Process Wheel:

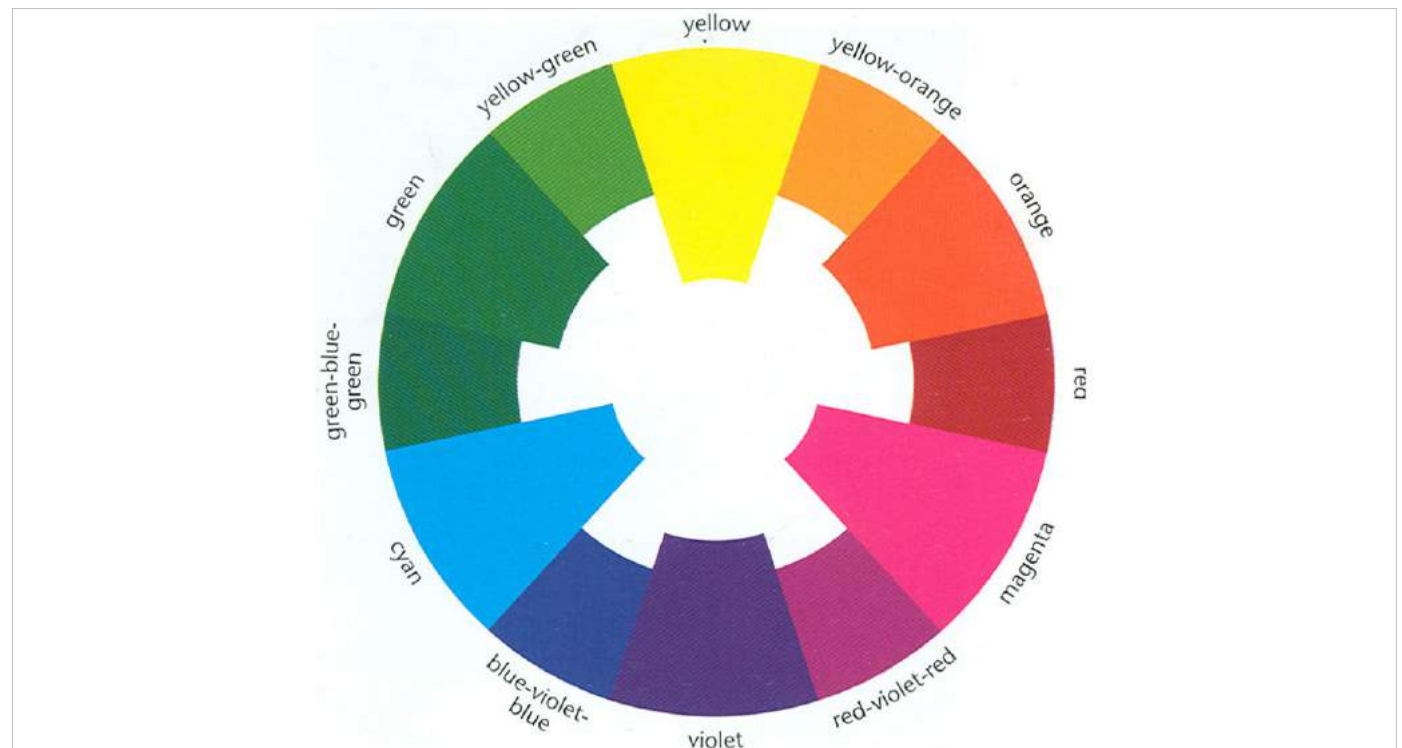
The Process Wheel has yellow, magenta and cyan as the three basic primaries that result in purer hues when mixed as contrast to Pigment Wheel. This system is used in printing and photography.

When equal parts of primaries of this wheel are mixed the following secondary hues occur:

- Yellow + Cyan = green
- Cyan + Magenta = violet
- Magenta + Yellow = orange

Again mixing the three primaries together in equal amounts produces black.

- Yellow + Green = Yellow-green
- Green + Cyan = Green-blue-green
- Cyan + Violet = Blue-violet-blue (ultramarine blue)
- Violet + Magenta = Red-violet-red
- Magenta + Orange = Red
- Orange + Yellow = Yellow-orange



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

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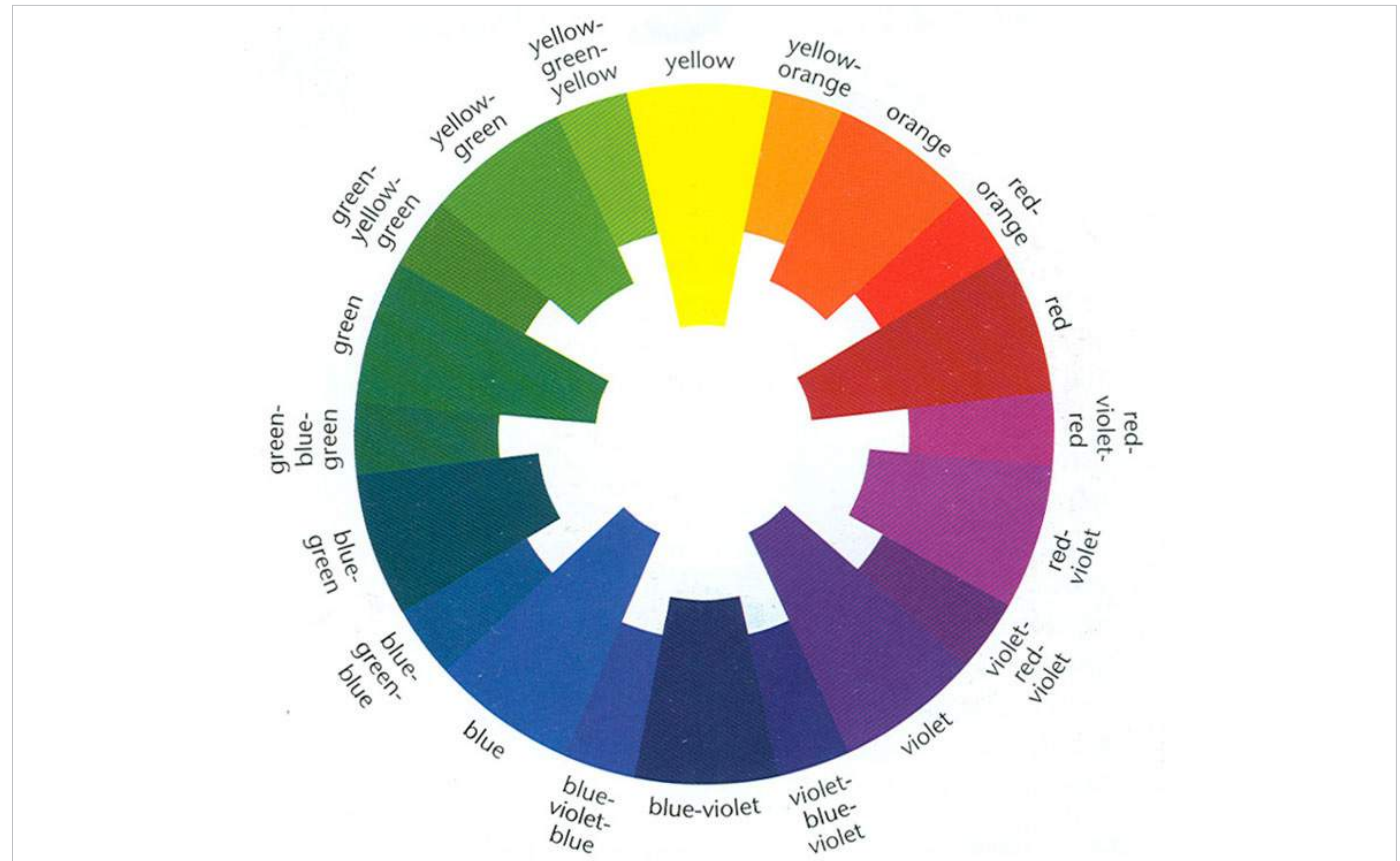
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. **Colour Description and Colour Theories**
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

• The Munsell Wheel:

Munsell developed a partitive colour system based on five primary hues – yellow, red, green, blue and purple. His colour system was based on afterimage perceptions that are derived from hues that we see in nature. He set each after image as the compliment to the primary hues. He further systematised the colour wheel into a three-dimensional colour tree described earlier in this section.



[1] <http://www.gutenberg-e.org>

The chapter is based on the review of the following books:

Feisner E.A.,(2006) Colour Studies Second ed. Fairchild Publications, NY.

Holtzschue, L. (2002) Understanding Color: An Introduction for Designers, John Wiley & Sons.

Pile, J. (1997) Color in Interior Design. McGraw-Hill companies Inc.

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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Colour Interaction and Color Effects

Every colour is seen in relationship to another colour. When you see two or more colours together they have a profound effect on one another. The study of colour interaction helps us understand and predict how a colour will be influenced by its surroundings.

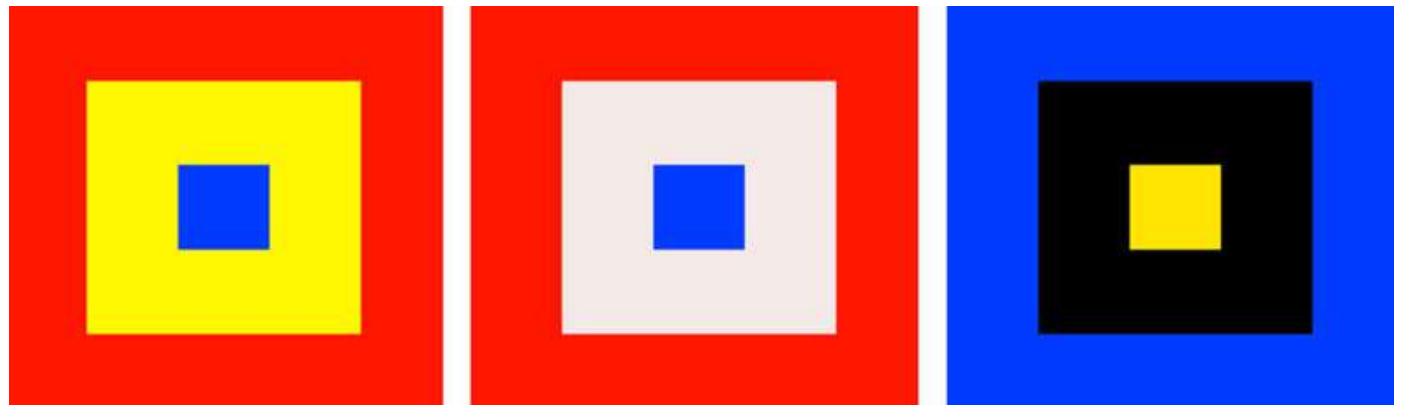
The different types of color contrast are the following:

1. Contrast of hue
2. Light-dark contrasts
3. Cold- warm contrasts
4. Complementary contrast
5. Simultaneous contrast
6. Contrast of saturation
7. Contrast of extension

• Colour Interaction:

Contrast of Hue:

Contrast of Hue occurs when a hue or color is separated and outlined by black or white lines. White lines weaken the 'strength' and appearance of the color and the colors around the white lines would seem darker. Similarly, a black line strengthens the appearance of the color and the colour around the black lines would seem lighter.



The strongest expression of contrast.

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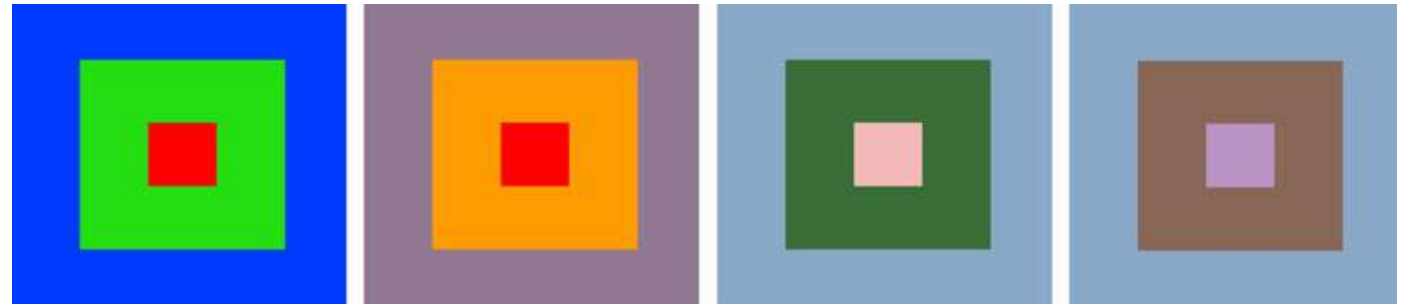
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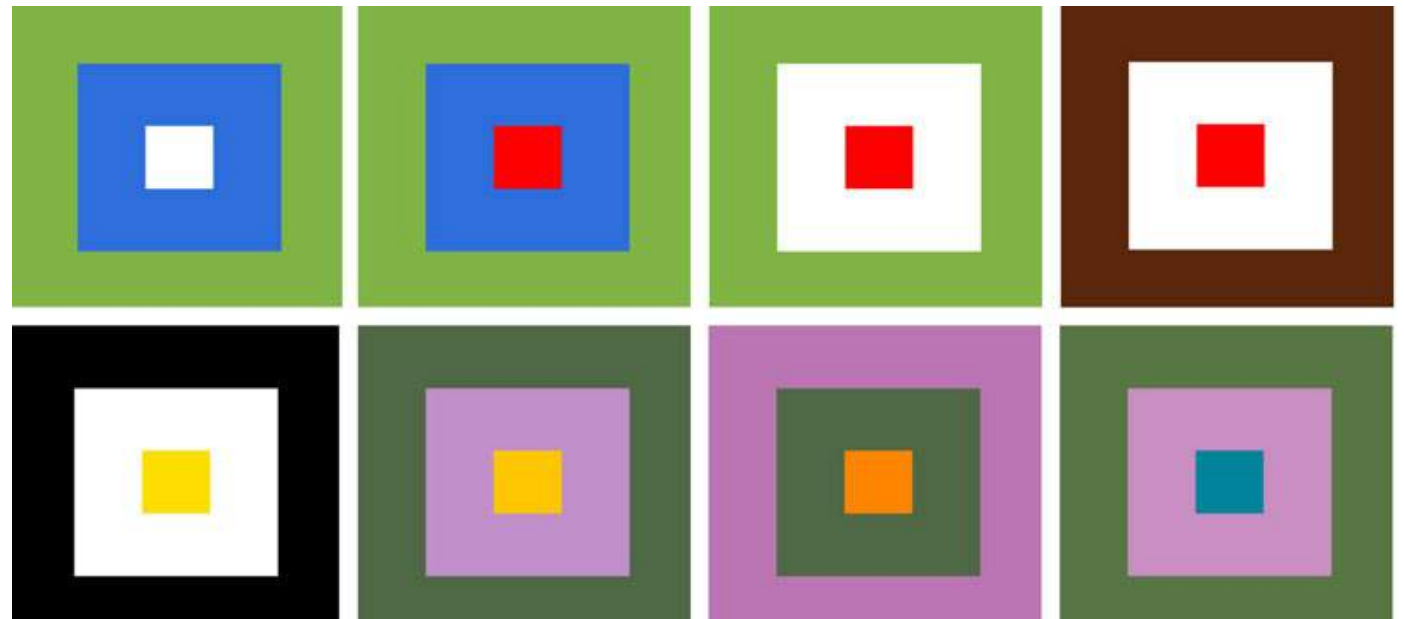
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Colors of greatest luminosity.



Colors of greatest luminosity with tints and shades.

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

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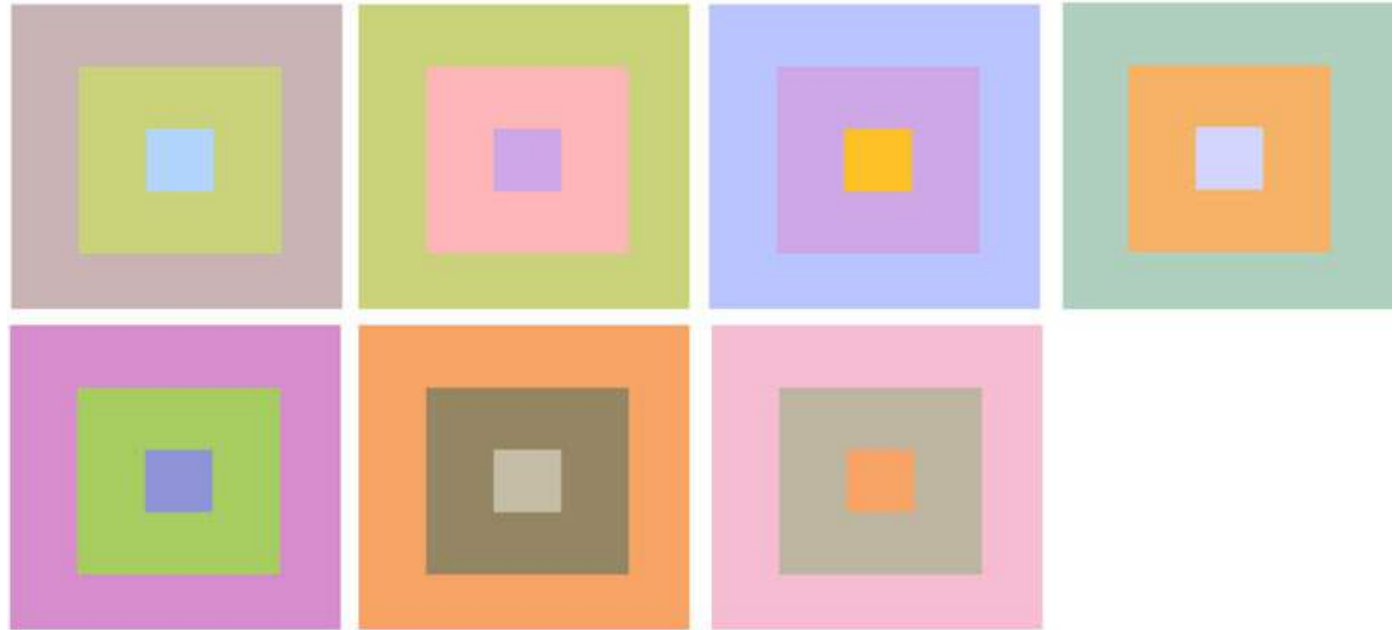
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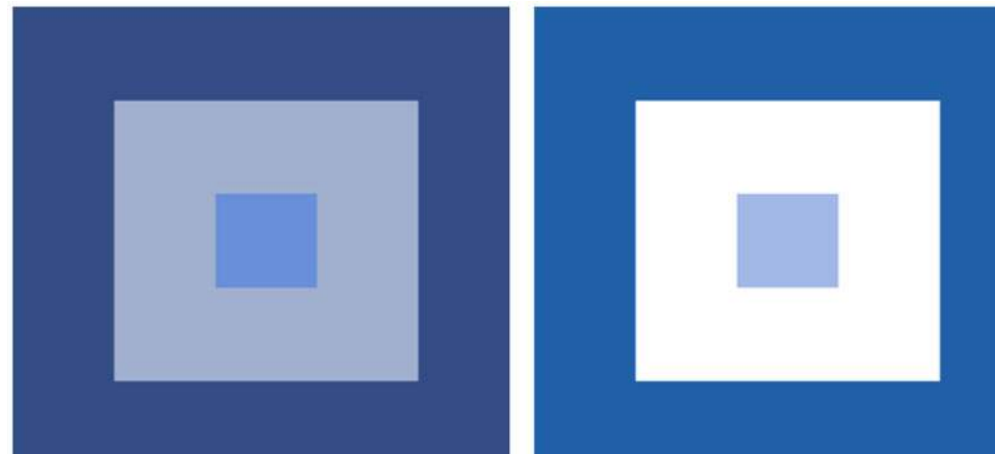
1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Light-Dark Contrasts:

Light dark contrast is contrast between light values and dark values. The strongest expressions of light and dark are the colors white and black.



Light color of equal brilliance.



Light & dark composition in white, gray and blue.

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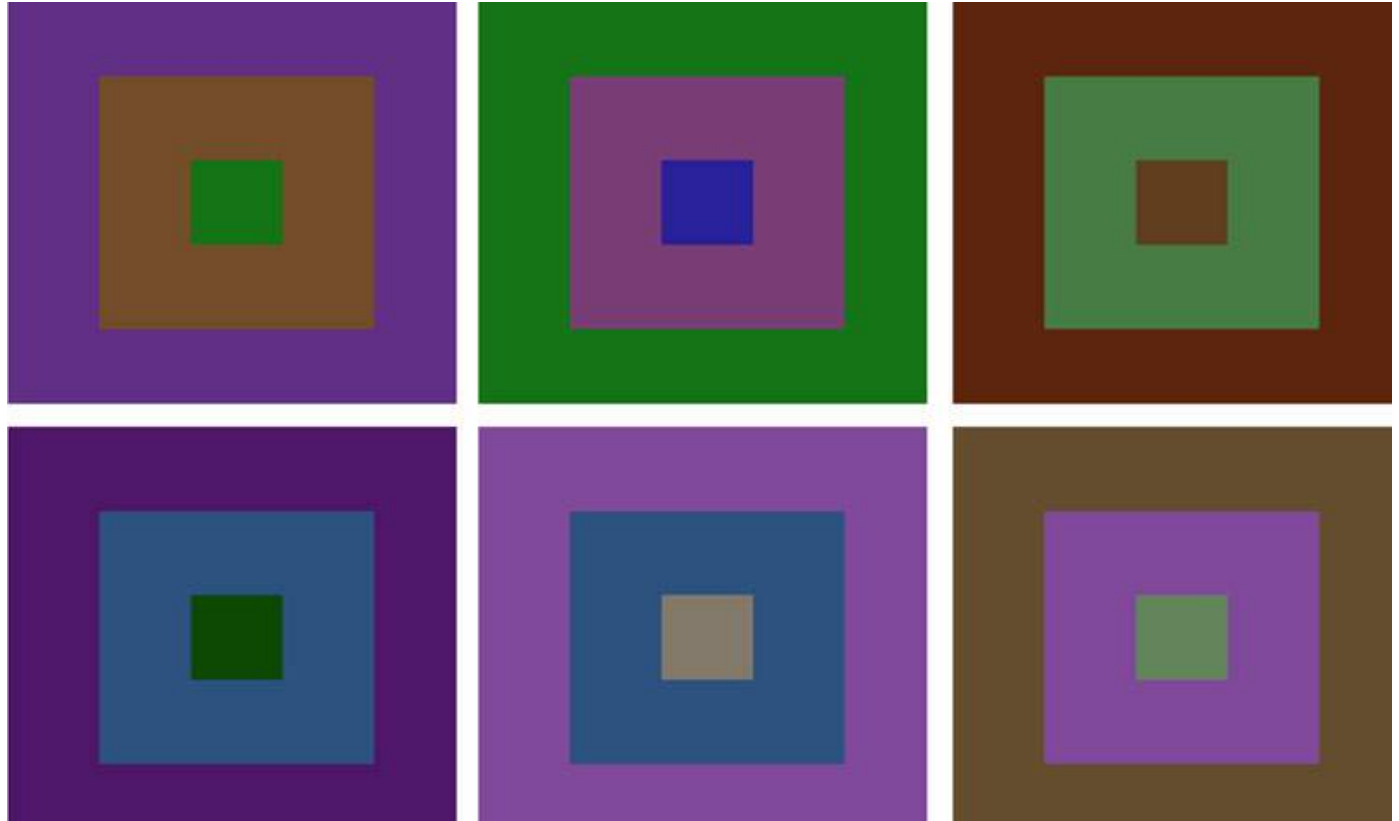
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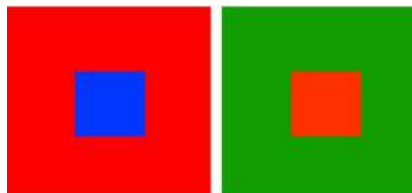
1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



Colors of equal darkness.

Cold - Warm Contrasts:

Cold-warm contrast refers to the contrast between cool and warm colors. Cool colors consist of blue, green and purple. Warm colors consist of red, orange and yellow. As seen in the colour wheel yellow is the lightest and violet the darkest hue; hence these two hues have the strongest light-dark contrast. Hues can be either cold or warm according to warmer or colder tones they are contrasted with.



Warm – cool contrast.

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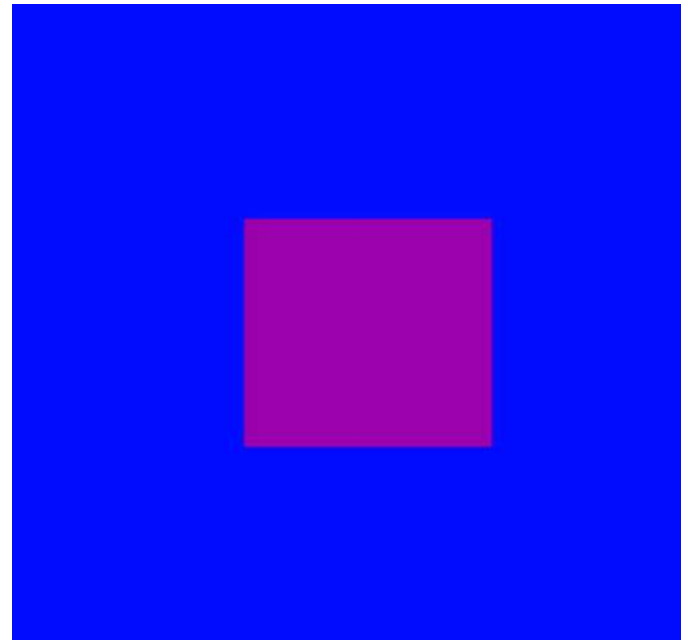
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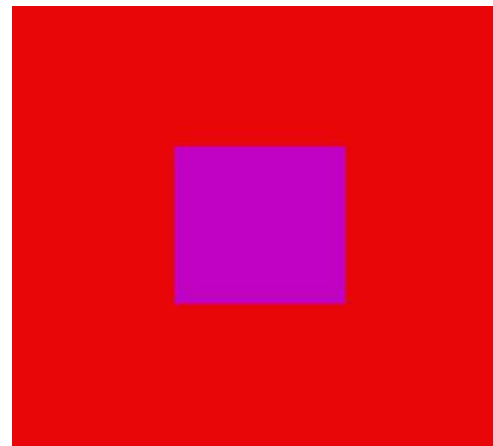
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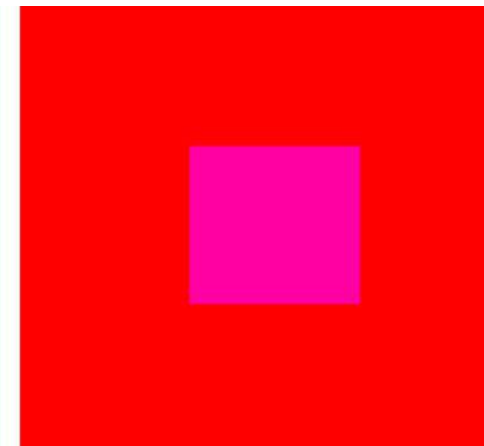
Blue as a warm.



Blue as a cool.



Cold warm modulation in red.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

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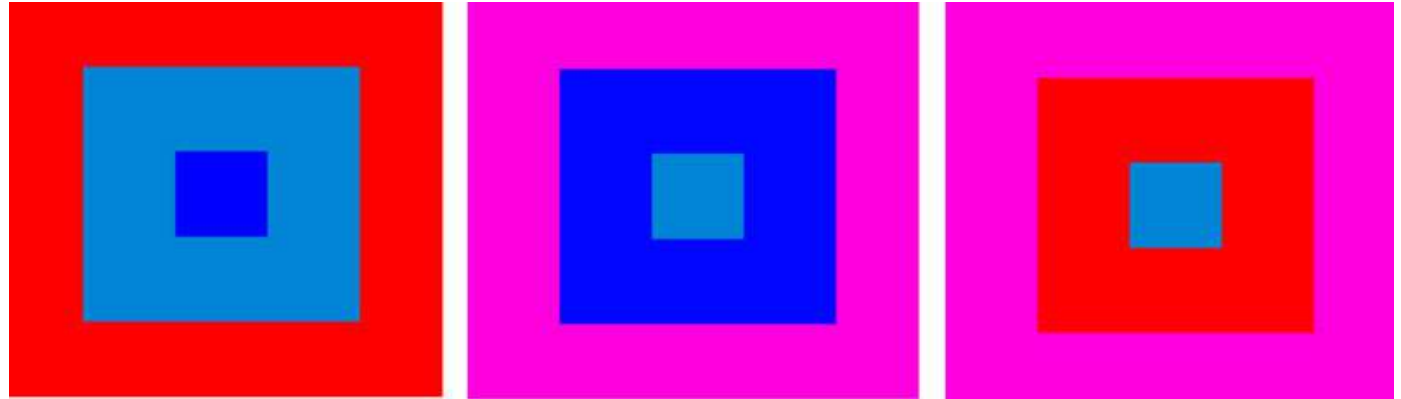
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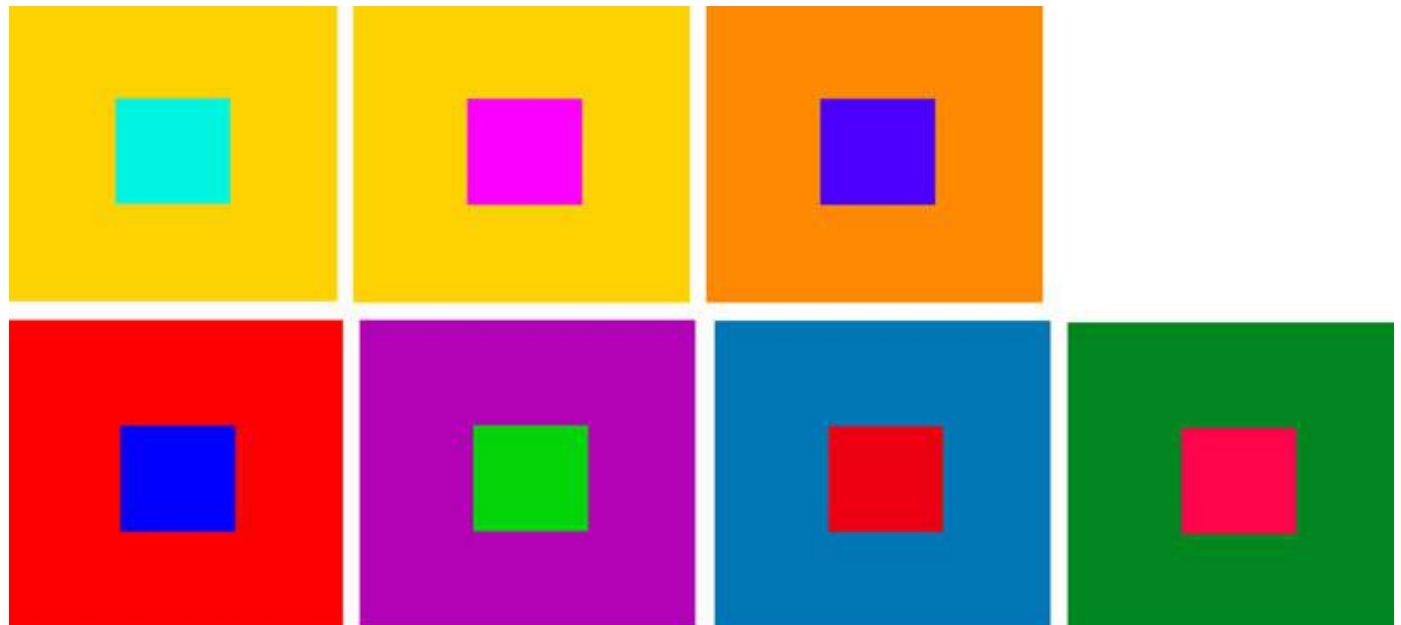
1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



Cold warm contrast.

Complementary Contrast:

Complimentary Contrast refers to the contrast between complimentary (opposite) colors. Complimentary colors are those that are directly opposite to each other on the color wheel. Each complementary pair has its own peculiarities. Red-orange/blue-green is a complementary pair as well as the extreme of cold warm contrast. Red and green are complementary, and the two saturated colors have the same brilliance.



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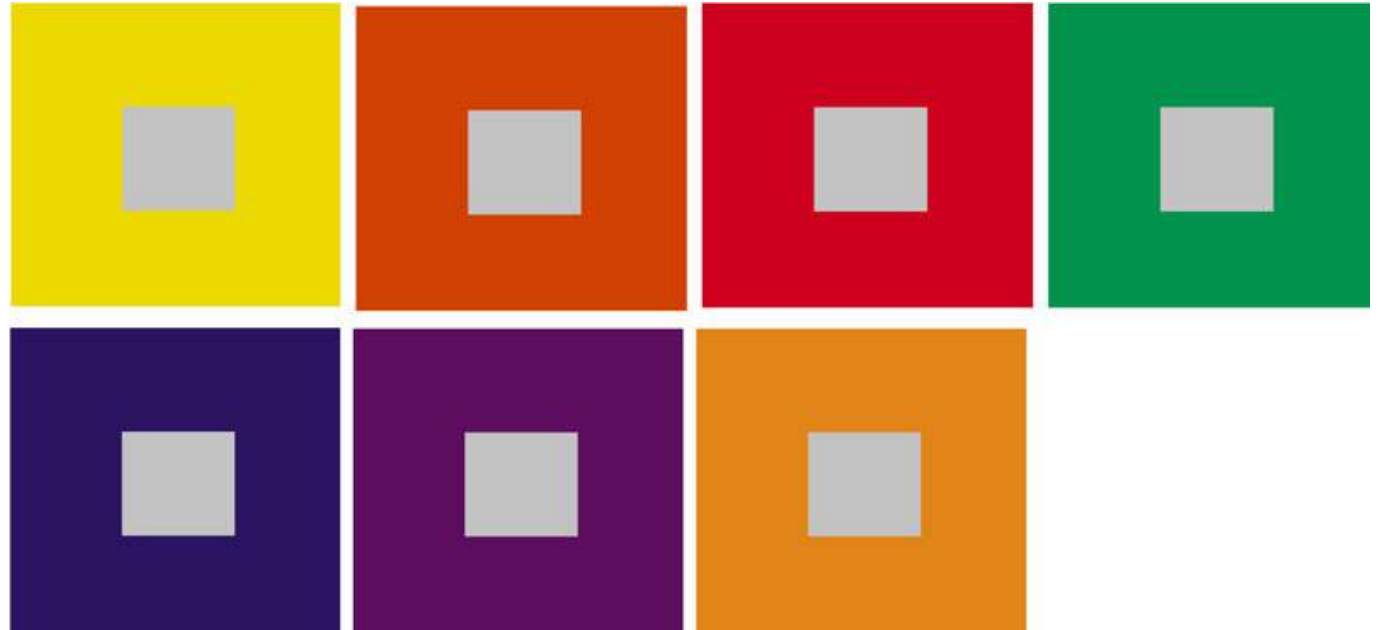
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

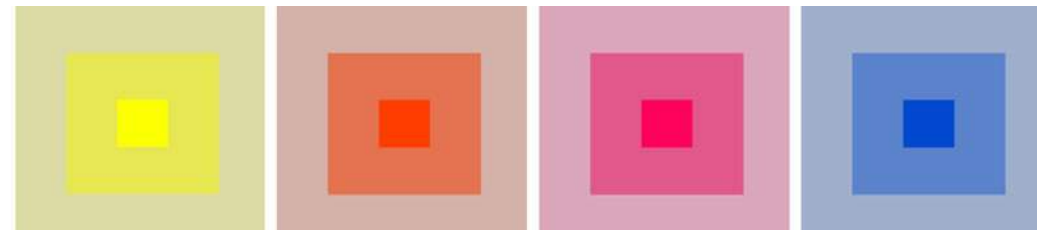
Simultaneous Contrast:

It is the contrast between a color and another color that is to the right or left of its complement. Each of seven pure color squares contains a small neutral gray square, matching the background color in brilliance. Each gray square seems to be tinged with the complementary of the background. The simultaneous effect becomes more intense, the longer the principal color of a square is viewed.



Contrast of Saturation:

It is the contrast between pure intense colors and dull diluted or grayed colors. Dull colors would appear to be duller when it is placed next to pure intense colors, and pure intense colors would appear more vivid when it is next to a dull color.



On a checkered pattern of 3 squares, luminous yellow, orange, red, or blue is placed in the center. The four corners are neutral gray in the same brilliance as the pure color. Graded admixture of gray with the pure color produces intermediate shades of low saturation.

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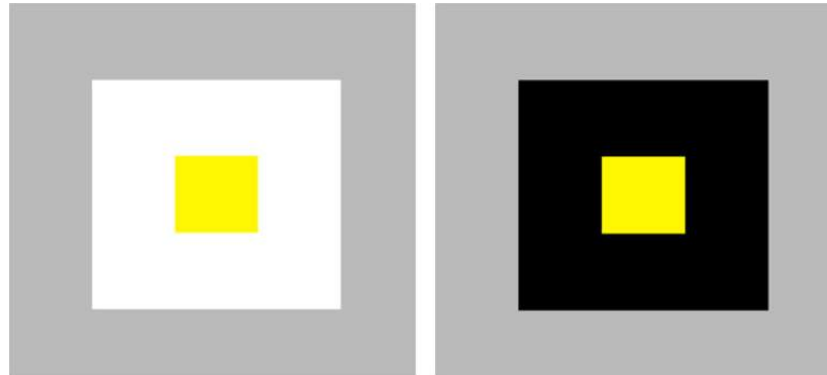
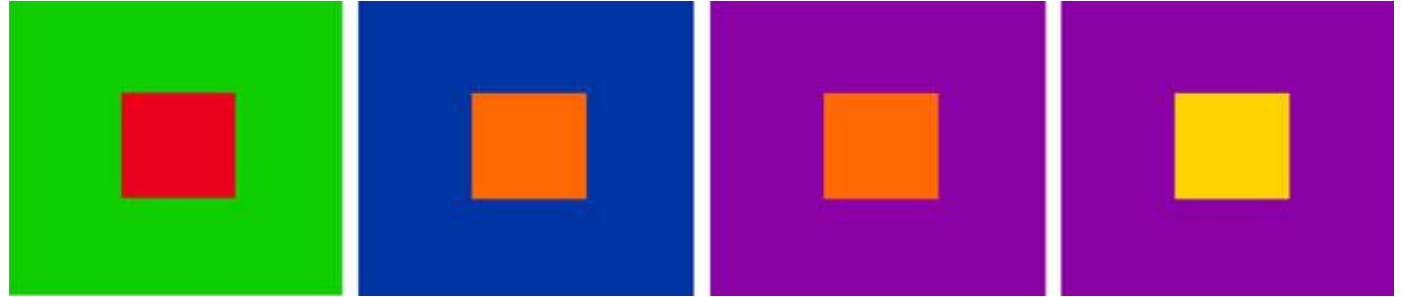
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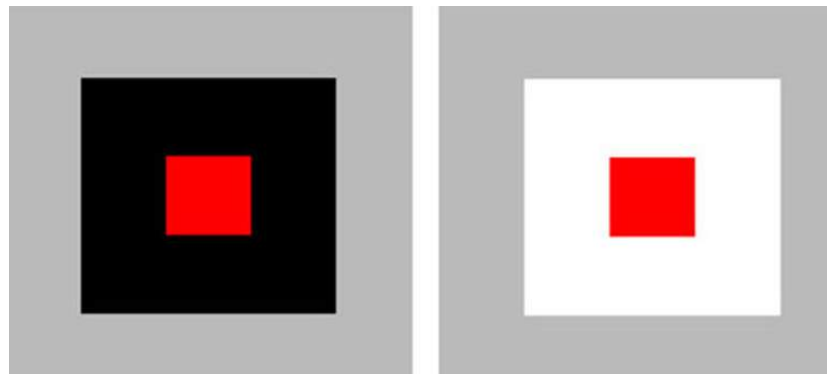
1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Contrast of Extension:

It refers to the contrast between the proportions of one area of color to another. Contrast of extension involves the relative areas of two or more color patches; it is the contrast between much and little, or great and small.



Yellow squares of equal size look bigger on white than on black.



Red squares of equal size look smaller than on black.

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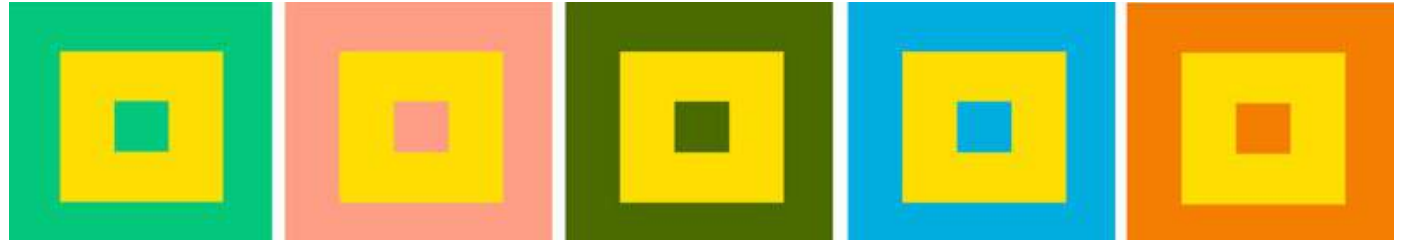
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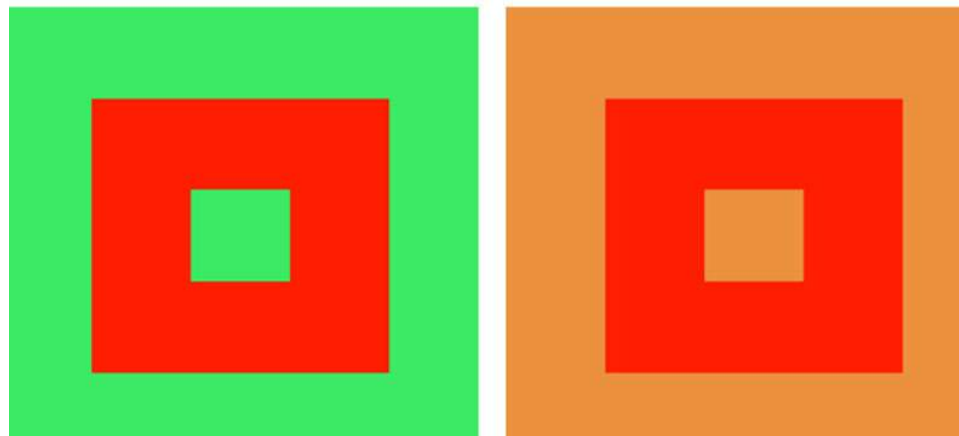
1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



Combinations showing how the same yellow, red and blue are altered in expression by different juxtaposed colors.



White comes up due to an orange tone.



Combinations showing how the same red is altered in expression by different juxtaposed colors.

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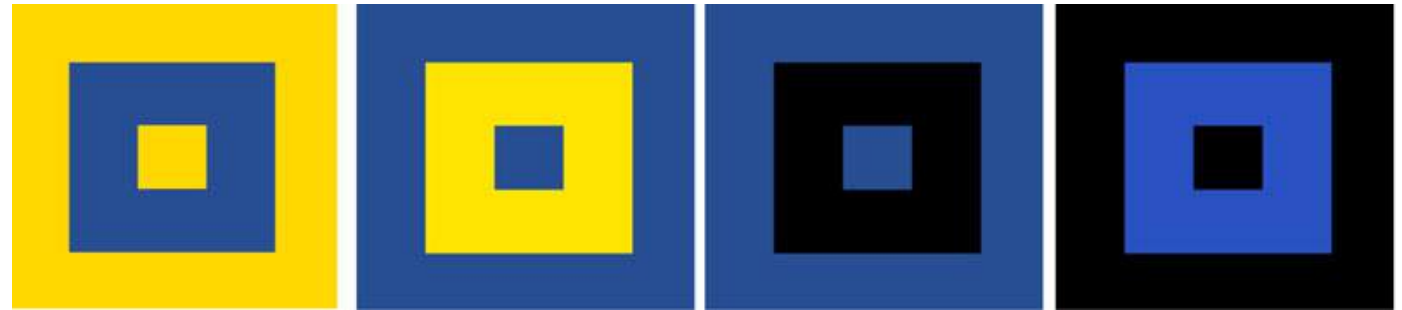
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by

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DoD, IIT Guwahati

Source:

<http://www.dsource.in/course/visual-design-colour-theory/colour-interaction-and-color-effects>



Combinations showing how the same blue with different color.

• Colour Effects:

'La Biennale', a funky bar in Venice, Italy by interior designer Tobias Rehberger. Unique design patterns and many colours are used to distort space and disguise reality.

SOURCE: Copyright © 2010 - 2011 yellowpelow.com



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

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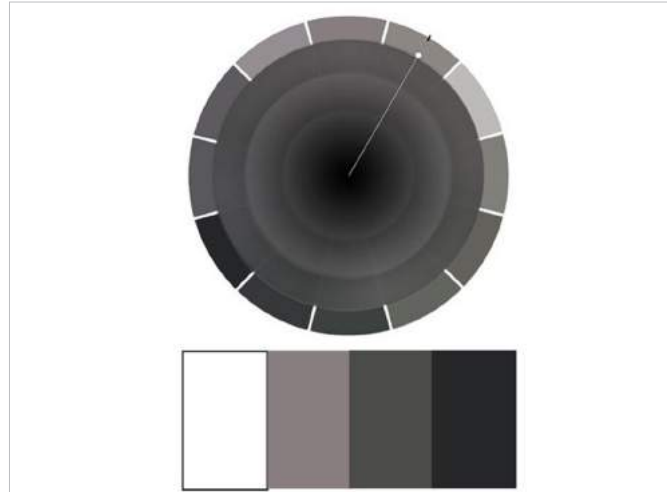
1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Colour Harmony:

Colour harmony is the synchronization, balance or the pleasingness of a group of colour.

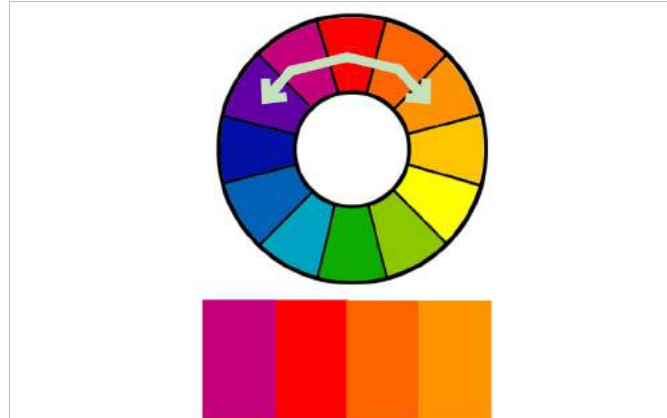
Acromatic Colour Scheme:

The “hueless” colors black, gray, and white, - the whole range of gray levels between black and white.



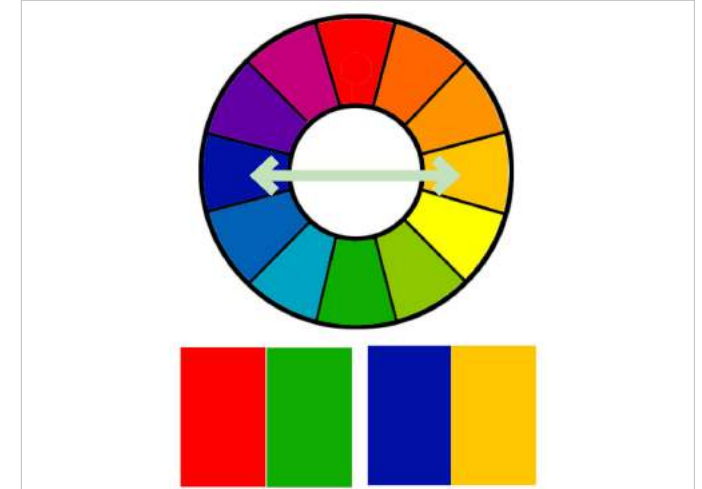
Analogous Color Scheme:

Analogous color schemes use colors that are next to each other on the color wheel. They usually match well and create harmonious effect.



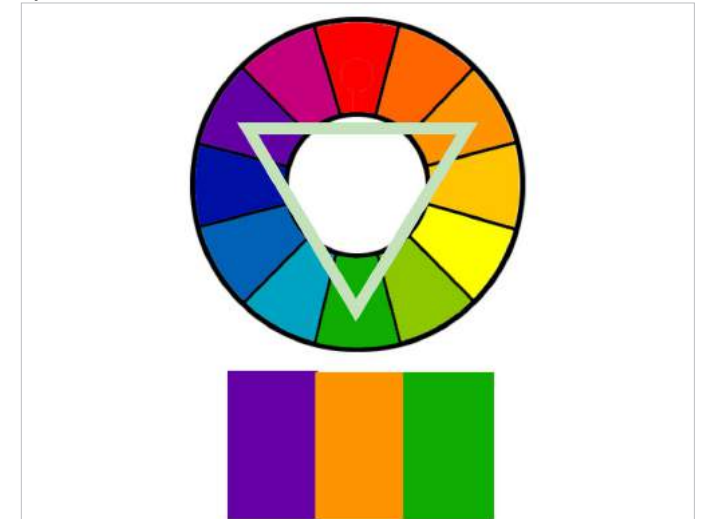
Complementary Color Scheme:

Colours that are directly opposite to each other in a colour wheel and appear opposite in character are called complementary colours. They create a vibrant effect.



Triadic Color Scheme:

A triadic color scheme uses colors that are evenly spaced around the color wheel.



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Visual Design - Colour Theory

Colours in Visual Design

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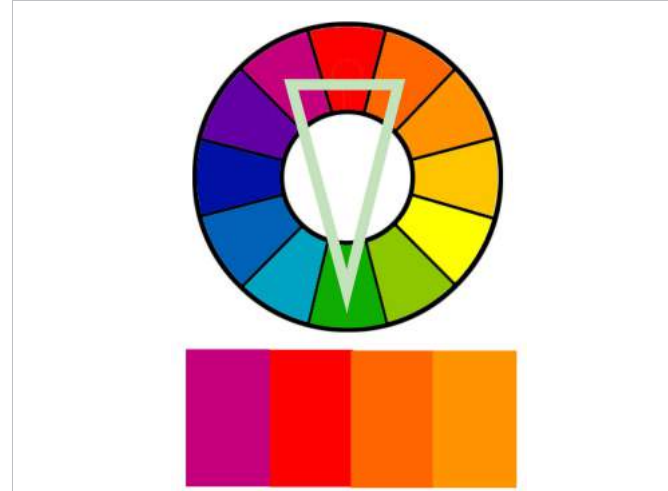
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. **Colour Interaction and Color Effects**
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

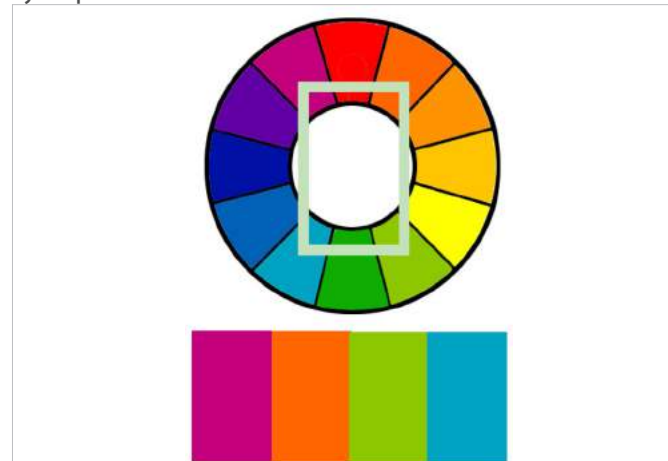
Split-Complementary Color Scheme:

The split-complementary color scheme is a variation of the complementary color scheme. A colour and the two colours adjacent to it's direct complement. It has high contrast but less contrast than complimentary colours.



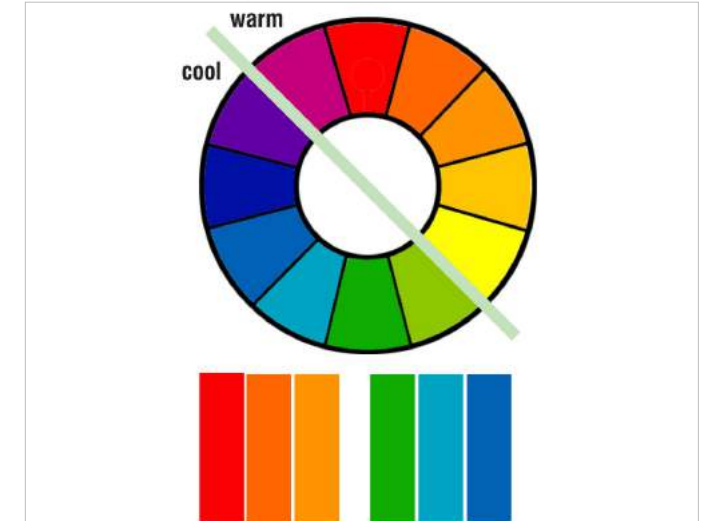
Tetradic Color Scheme:

The rectangle or tetradic color scheme uses four colors arranged into two complementary pairs. It offers plenty of possibilities for variation.



Temperature:

The temperature of a colour is its relative warmth or coolness. Cool colours contain blue or green: blues, greens, violets, and steps between them. Warm colours are reds, oranges, yellow, and steps between them.



Feisner E. A., (2006) Colour Studies, Fairchild Publication, Inc. NY.

Itten J. (1974) The art of colour: the subjective experience and objective rationale of colour, John Wiley and Sons.

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Visual Design - Colour Theory

Colours in Visual Design

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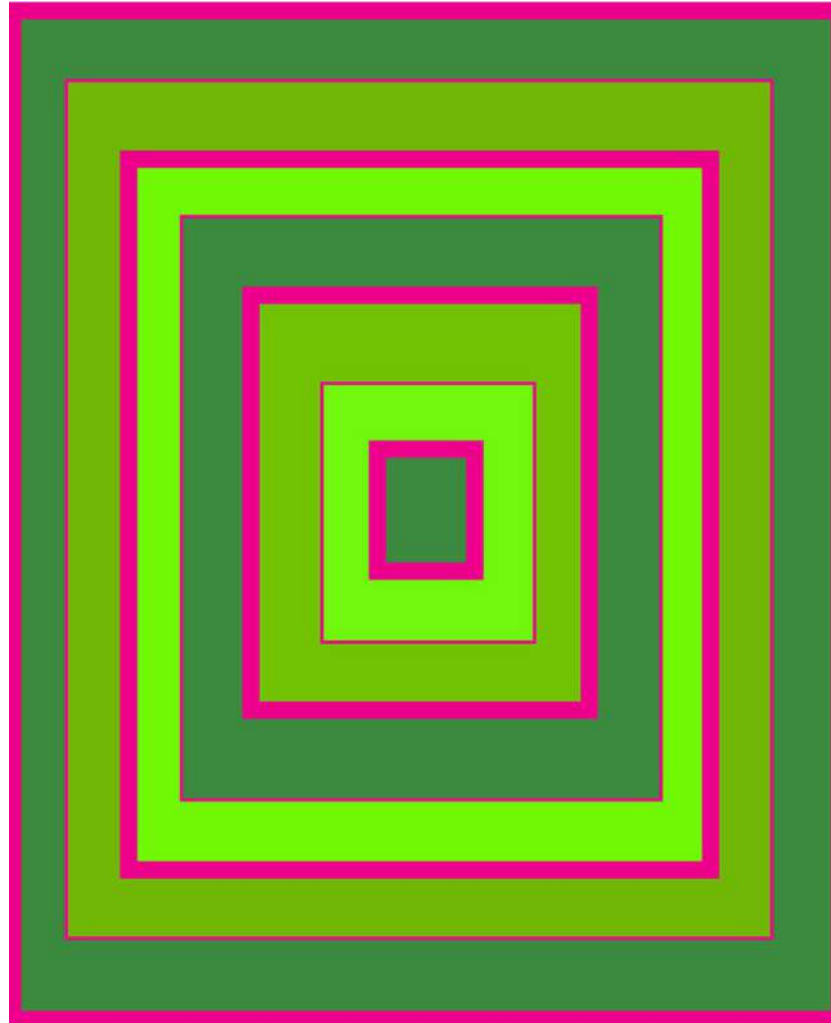
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. **Colour in Design Principles**
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Colour in Design Principles

It is important how colour behaves with different principles of design. The key design principles are:

Rhythm:



The principle of rhythm provides order and unity in the design. A rhythmic use of colour provides a unified and coherent effect. Repetition an important element of rhythm.

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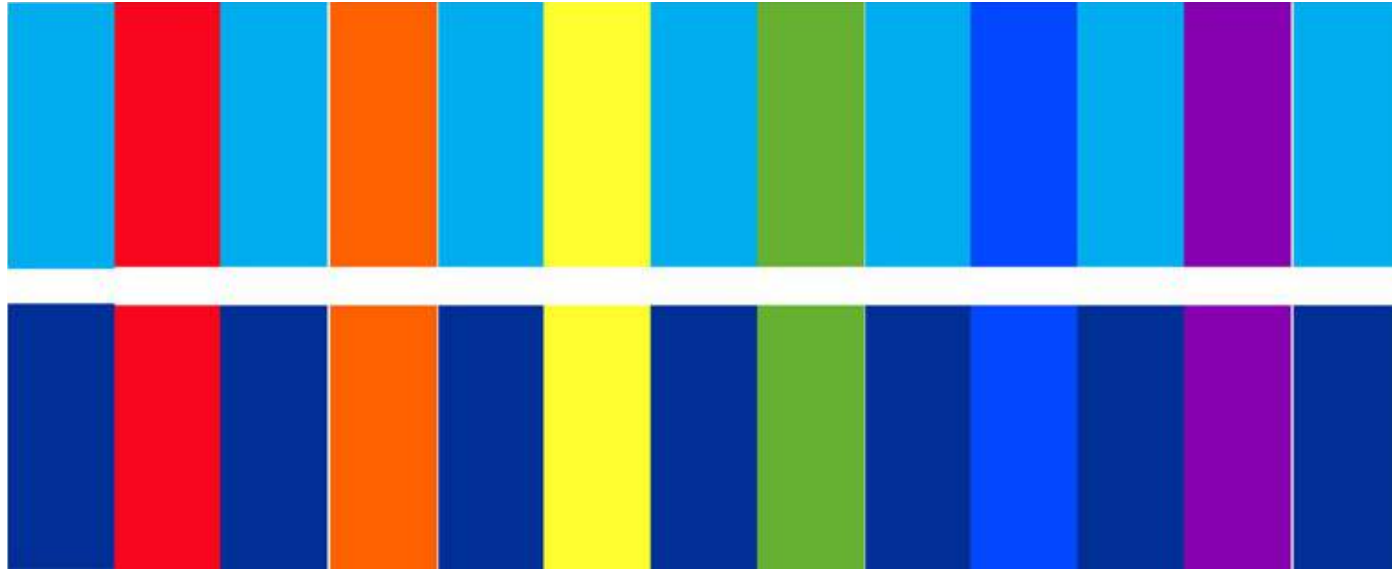
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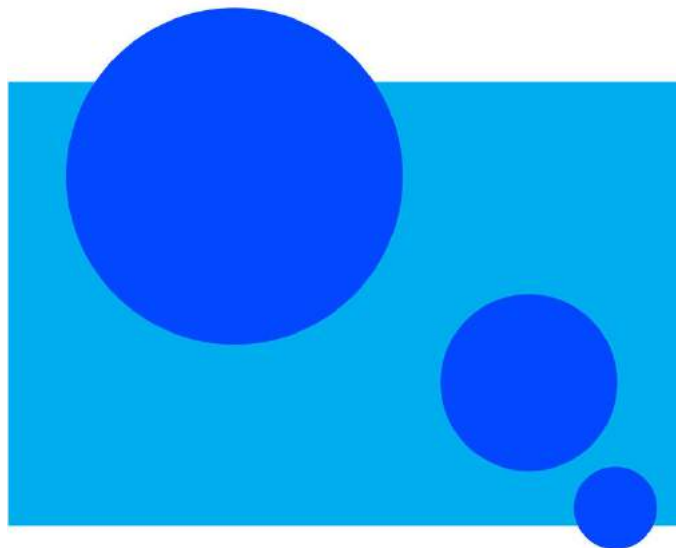
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Balance:

Balance relates to overall visual effect of all the components together in a composition or design. Symmetry is the easiest way to achieve balance. Asymmetrical balance is achieved when the components in a composition are not mirrored along the central axis but the balance is achieved by overall placement of the objects in such a way that it creates visual balance.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. **Colour in Design Principles**
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

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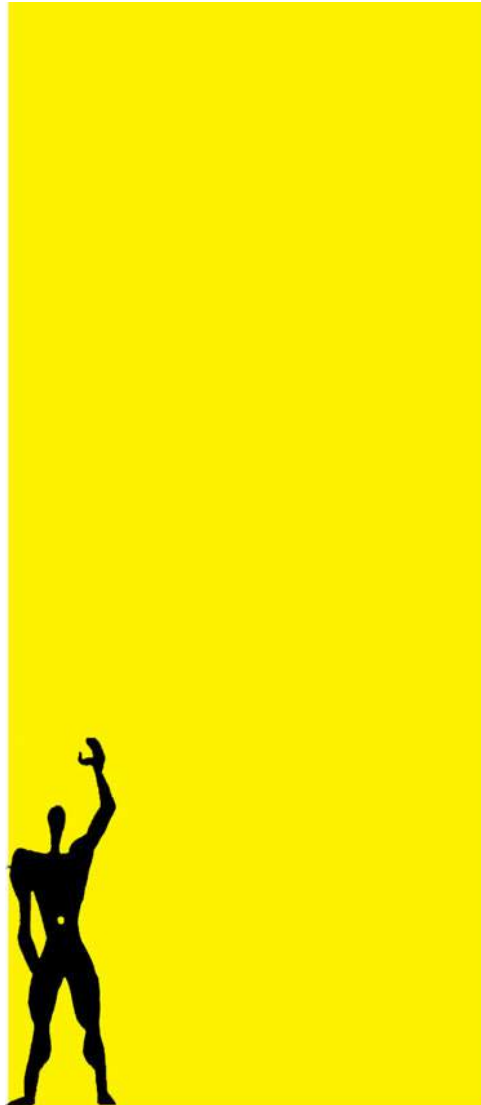
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. **Colour in Design Principles**
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Proportion and Scale:

The proportion relates to the relationship formed between one part of the design with another part and the overall effect. While the principle of scale looks into size relationships. The scale of the colour used can be judged in two ways 1) the actual colour used. It deals with the amount of colour used in a composition and the amount of surface area occupied by a colour(s); 2) the boldness of the colour used and its scale effect on overall composition.



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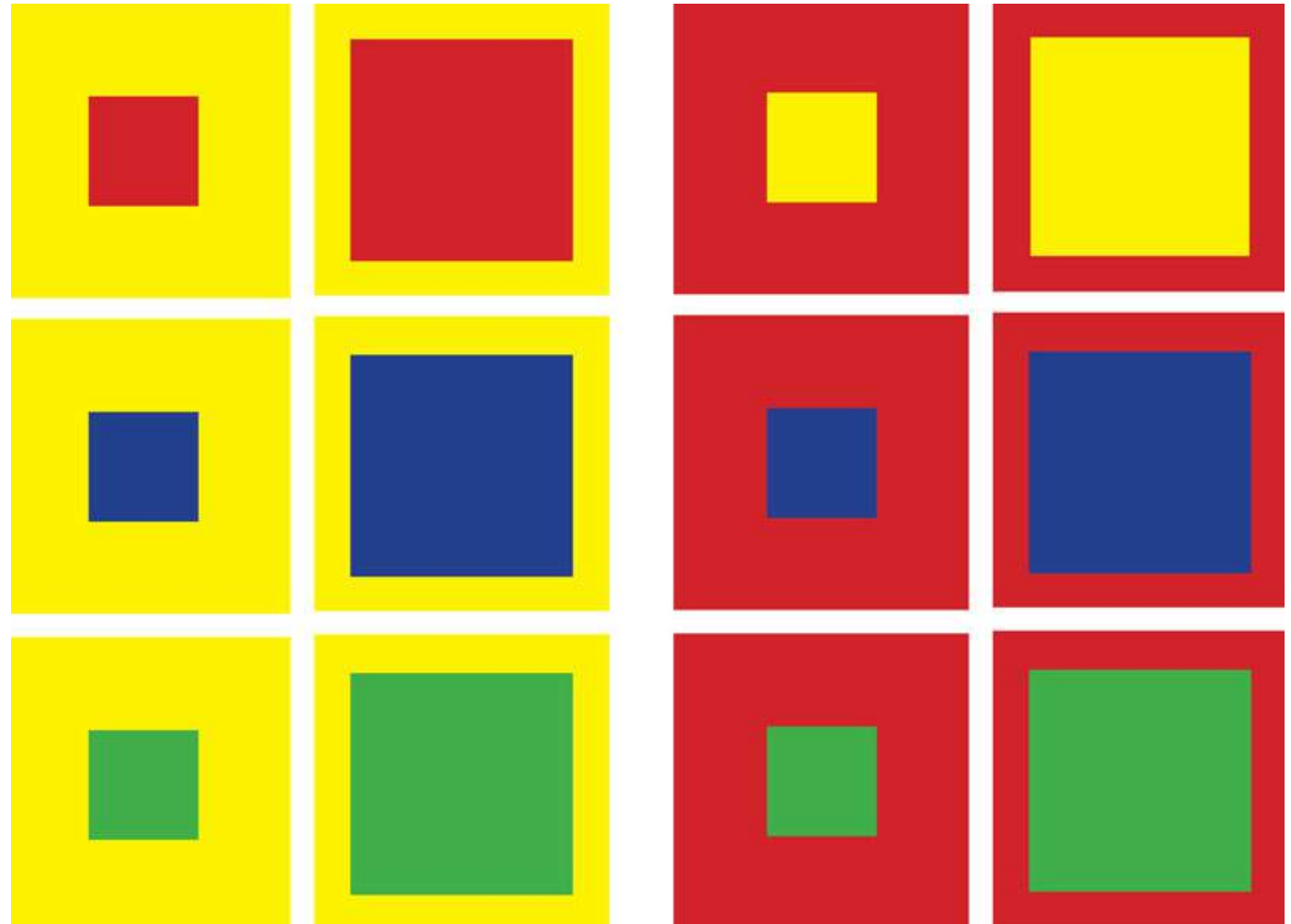
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1. Introduction

2. Visual Design

3. The Science of Colour

4. Colour Perception and Human Responses

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. **Colour in Design Principles**

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

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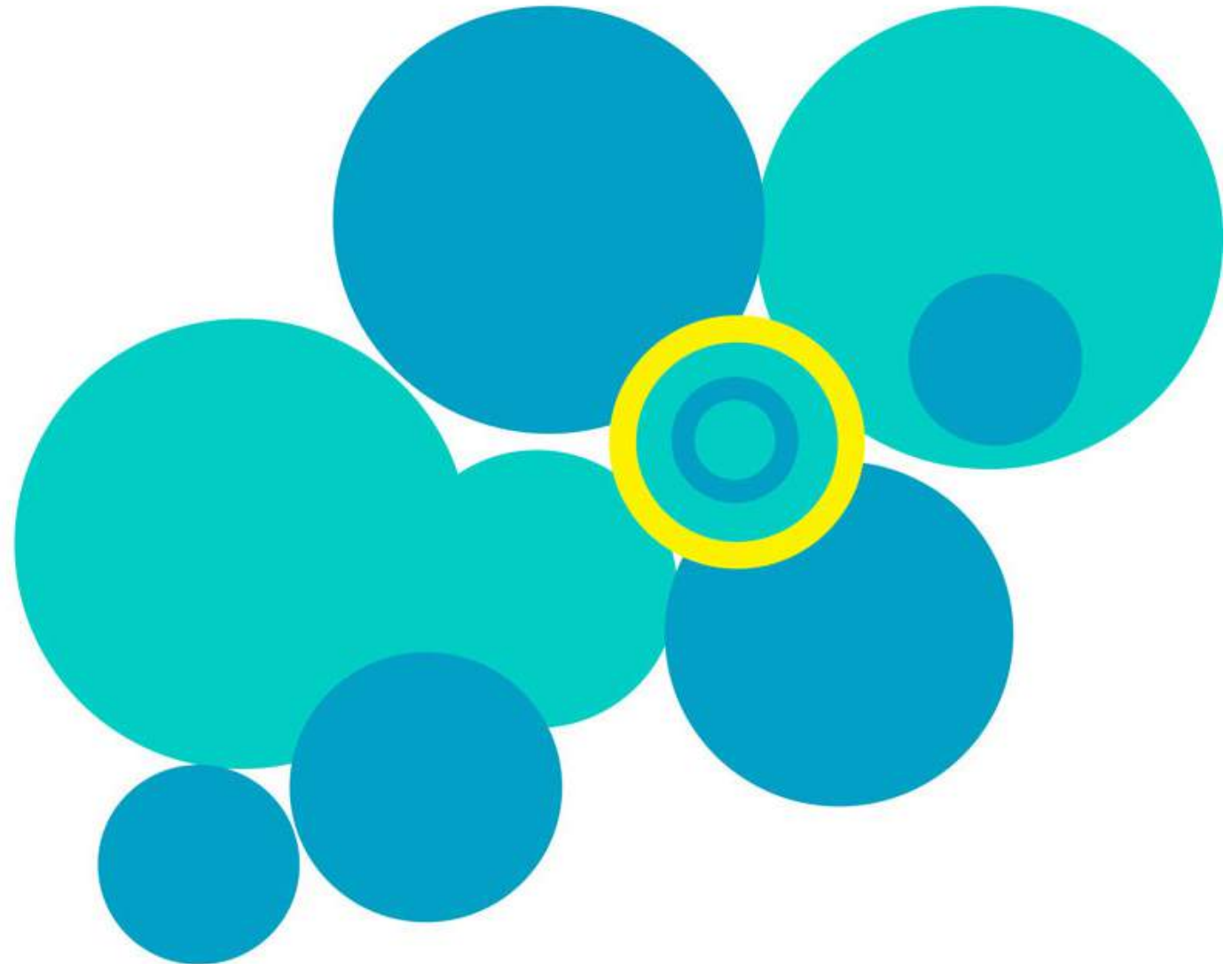
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Emphasis:

It deals with creation of areas of interest or focus for the viewers.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. **Colour in Design Principles**
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

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Wong W. ((1997) Principles of Colour Design: Designing with Electronic Colour2nd Ed., John Wiley & Sons.

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Use of Colours in Products and Packaging Design

Research has shown that colours are an important product characteristic and play an important role in the commercial viability or the sale of the products. However, colours of products, specifically every-day products, are very important not just for influencing sales but also for making products pleasant to use. Attractive products produce positive emotions, causing mental processes to be more creative, and users to be more tolerant of minor difficulties in case of day-to-day products [1].

The colour of a product and its packaging as well as the way it is displayed is usually the first thing that a consumer sights in the showrooms even before inquiring about the product's features and functions. We sometimes find the less successful product brands using the colour of a successfully established brand in the market selling a similar product to hike its sale. Some colours also get associated with certain products over time and gradually stand for the trust and quality for that brand and product.

The colour to be assigned to a product and its packaging requires research and creative design ideas for its success. The colour of a product should interact with its main use and the users. The colours of the products receive reactions from the viewers, users and buyers and it affects the way we feel about a designed product. We naturally link colour to memories and moods. Although there are no hard and fast rules or right or wrong use of colours, making a bad colour choice for your design will undoubtedly affect its success. The colour may be assigned to a product based on the following criterias:

To stand out amongst other products in the display – Eg. Vanish, stain remover- 'trust the pink'.



<http://marketingstrategems.blogspot.in>

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Colours in Visual Design

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To represent the characteristics product itself.

Eg. coffee packaging is usually dark brown in colour to represent the strong flavour and colour of the coffee beans. The colours of the room fresheners are usually soft and soothing.



<http://www.21food.com>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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DoD, IIT Guwahati

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<http://www.dsource.in/course/visual-design-colour-theory/use-colours-products-and-packaging-design>

To give a message or portray the brand/product's ethos.

Eg. energy efficient or recycled products are of green (green symbolises environment and sustainability) or natural colours.



<http://organiconthegreen.wordpress.com>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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<http://www.dsource.in/course/visual-design-colour-theory/use-colours-products-and-packaging-design>

To target specific group of consumers.

Eg. Kids are attracted to bright colours, hence the range of kids products are in bright. The teenage products are usually trendy and hip.



A range of bright coloured kids products.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. **Use of Colours in Products and Packaging Design**
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details



To respond to the function and purpose of the product – eg. safety jackets are bright yellow or orange for high visibility, fire extinguishers are red to symbolise fire, to grab attention and convey alertness.

According to Dave Vogler a product designer in NY there are four areas that colour study for any product must consider. The Four F's: First impressions, Form, Function, and Fashion.

First Impressions:

Colour psychology plays a key role in product design and marketing, hence it is important to understand the meanings of colour and its psychological and emotional influences on the consumers. As colour conveys different messages to different groups of people, care should be taken when using colours in different settings.

Form:

Clever use of color can accentuate certain features, drawing attention to them, or minimize other features so aren't readily noticed. In general, lighter colors show more contrast between light and shadow, so the eye will notice these features more prominently. Bright colours are used to highlight key functions or features.

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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Function:

Color is also a part of some firmly established and universally accepted functional interfaces. Once color enters the picture as a user interface language, the surrounding product should be neutral, so as not to distract the user from noticing interface features.

Fashion:

After the previous color effects are considered, color variations usually boil down to fashion and industry trends. Consumer products can edge out their competition with an offering of colors appealing to personal taste.

He further adds, 'Color introduces a manufacturing premium- whether it is painted, powder coated, or molded in color, it will simply cost more to control the color matching in manufacturing. If there is not financial support behind the decision to create color variations, it won't make it into production.' [2]

The process of designing a product and getting it into mass production is a lengthy and time-consuming procedure. Markets often change their appetite for colours and it is therefore critical to be able to forecast a market's preferred colour for a given product (colour forecasting) [3].

[1] Norman DA (2004), 'Why we love (or hate) everyday things', New York: Basic Books.

[2] <http://www.fuelyourproductdesign.com>

[3] Diane T and Cassidy T (2005), Colour Forecasting, Blackwell Publishing.

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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Use of Colours in Interior Design

Colour is an important aspect of the design of interior spaces. We know that a well planned space can be enhanced by using 'appropriate' colours. An appropriate colour for a space is relative and cannot be prescribed.

The use of colours in interior spaces as the translation of abstract colour schemes, theories and meanings into real materials, surfaces, experience and use in a space is a complex matter requiring creativity, judgment and often comes with experience. However, organized methodology and advance planning of colours can lead to successful use of colours. Pile, J. (1997) argues that just as one would not start construction of a building without construction drawings and plans, one should not start working on colours in interior spaces without careful planning. An understanding of the colour theories and effects also supports confidence in use of colour in practice. Various devised colour schemes may not be directly applicable to actual colour schemes in practice but it helps in understanding the way in which colour appears to the viewers, its different effects and provides a sound background for appropriate use of colours. An understanding of colour psychology and symbolism play an important role while choosing colours for interior spaces in different settings for different functions.

There are three key questions to be asked while working with colours in interior spaces:

- WHAT ?
- WHO ?
- WHERE ?

WHAT is the function/purpose/use of the space you are choosing colour for?

- Colours used for residential interiors can be highly personalised depending on the taste and choice of the owners. Hospital interiors are generally white and blue to indicate cleanliness and being calm. In contrast many experiments can be done with trendy, bright colours while choosing colours for fast-food joints and restaurants targeting young crowd. The function of the space corresponds to colours based on the preferences of the clients, users, intended ambience, atmosphere as well as desired mood and emotions.

WHO is the end user of the space you are choosing colour for?

- Before you derive a colour scheme for an interior space it is very important to inquire the use of the space and their needs and attitudes- what is the age group, whether children, youth or elderly? Are there people with special needs requiring special design considerations? Young children are attracted more by colour than shapes and infants prefer red and blues. For elderly people all colours will be dimmer and visual resolution will be lower. Hence while designing for elderly people, designers should use bright colours and make sure that brightness and contrast is especially high.

WHERE is the location of the space you are choosing colour for?

- Colour schemes may vary for spaces in hot and bright climate to cold and dull weather, in specific cultural and social settings, in different physical and geographical locations.

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

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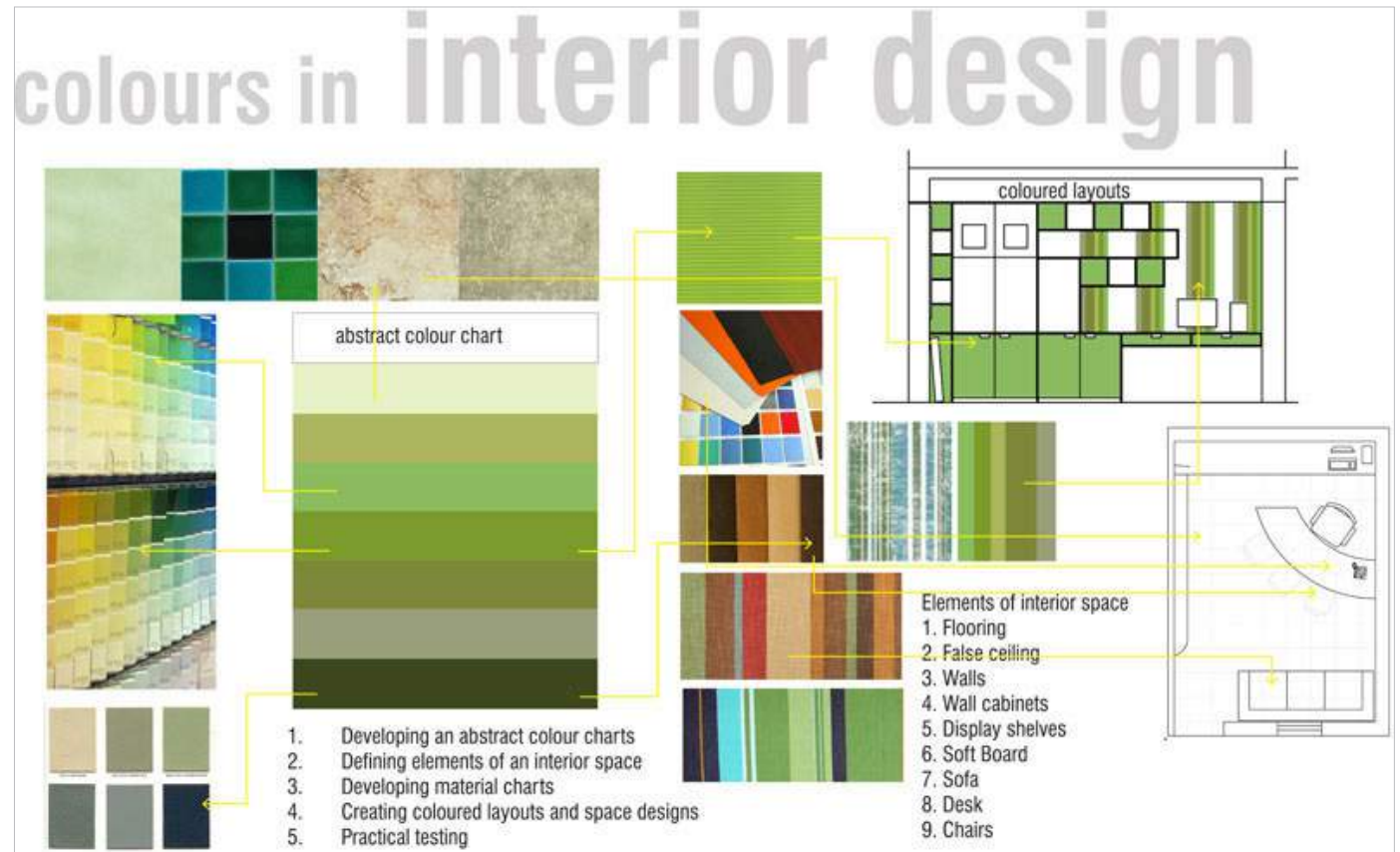
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Colour Methodology in Interior Design:



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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Source:

<http://www.dsource.in/course/visual-design-colour-theory/use-colours-interior-design>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. **Use of Colours in Interior Design**
10. References and Links
11. Contact Details



Interior renovation for Principal's Office - Secondary School. Before and after images.



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Visual Design - Colour Theory

Colours in Visual Design

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<http://www.dsource.in/course/visual-design-colour-theory/use-colours-interior-design>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

There are a few steps to follow that might be useful for developing appropriate colour schemes for successful interior spaces.

1. Developing an abstract colour charts
2. Defining elements of an interior space
3. Developing material charts
4. Creating coloured layouts and space designs
5. Practical testing

Developing an Abstract Colour Charts:

Developing colour charts is very useful in developing satisfactory colour schemes for interior spaces. The colours for abstract charts should be chosen based on the answers to the previously mentioned 3W's but should be independent of actual layout and general design of a particular space. Abstract colour charts can be merely bands of desired colours and can be created using coloured papers or paints like watercolour which gives more flexibility in producing different colours of different shades and tints by adding and mixing of pigments. Choosing the first colour and adding colours in sequence with a constant attempt to achieving satisfying relations is the aim of this exercise. Several alternatives may be laid out for a particular key colour and final selection can be delayed until total scheme is complete.

Defining Elements of an Interior Space:

The next step is to define the elements of the interior space that a designer is to conceive. Several elements of an interior space may share same colour hence it is important to make a list of elements in the interior space eg. floors, walls, ceiling, architectural features, doors, upholstery, furniture, artwork, etc.

Developing Material Charts:

After a satisfactory colour chart is derived assign real material colours to match the chart colours. Samples of paint colours, wood finishes, tapestry, veneers, laminates etc available from various suppliers can be used to create material charts and schemes.

Creating Coloured Layouts and Space Designs:

After the abstract colour and material charts are derived and the elements of interior space are determined, the next step is to transfer the material chart to a space layout or model. It is best to start with areas that occupy large spaces such as floor, ceiling, walls or to start focus objects or key element of the design which will act as a key colour in your colour scheme. The samples from the material chart are indented to stand for the way in which each colour will look in the final placement. After the assignment and placement of colours in the plan and elevation drawings, developing a physical model or a 3d computer model can be very useful to create realistic images of the space with desired lighting effects.

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. **Use of Colours in Interior Design**
10. References and Links
11. Contact Details

Practical Testing:

The actual materials when applied in real sometimes may appear very different from their samples, hence some practical testing on smaller areas on the site is useful. Also, viewing the entire piece of upholstery or laminate sheets may give a better idea of the final effect and there are less chances of getting wrong. This becomes more clear with experience and knowledge about materials available in the market.



The location and total area covered by a colour within an interior space can make a great deal of difference in influencing a space's character. The effect of a hue on the floors is different from the effect of the same hue on the ceiling. Mahnke (1996) views on the effect of a colour when applied at different locations such as ceiling, walls or floor in a is described here.

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Visual Design - Colour Theory

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<http://www.dsource.in/course/visual-design-colour-theory/use-colours-interior-design>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

However, this may vary extensively depending on the tints, tones and shades of the hue. Personal preferences and cultural parameters also play a key role in defining the character of the space based on the colour usage. Also, the amount of colour used in a space may vary affecting its character and appearance. eg. red can be used to highlight or gain focus on certain areas or walls whereas too much application of red in living areas may be difficult to live with. The same red can work well on large surfaces and areas if there is a lot of natural light. It can also be used extensively in trendy food outlets, pubs, etc.

Colour, material and lighting choices for interior spaces may be different for residential use, retail outlets, restaurants, hotels, showrooms, offices, religious buildings, transport interchanges etc depending on its location, climate, culture, activity and preferences.

• RED:

- Ceiling: Intruding, disturbing, heavy
- Walls: Aggressive, advancing
- Floor: Conscious, alert, pompous

Red can also give energizing effect and is used in case of trendy fast-food joints, pubs etc. However, over use of red can add complexity to space and hence should be carefully used.



Temporary Space designed for Venice Architectural Biennale 2006 - Youth Hostel, Prague.

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- **YELLOW:**
 - Ceiling: Luminous
 - Walls: Exiting to irritating
 - Floor: Elevating, diverting

Because of high visibility, yellow is used for safety indicators. It can give fresh feeling when used appropriately. A good colour for kitchen or part of children's room.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. **Use of Colours in Interior Design**
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

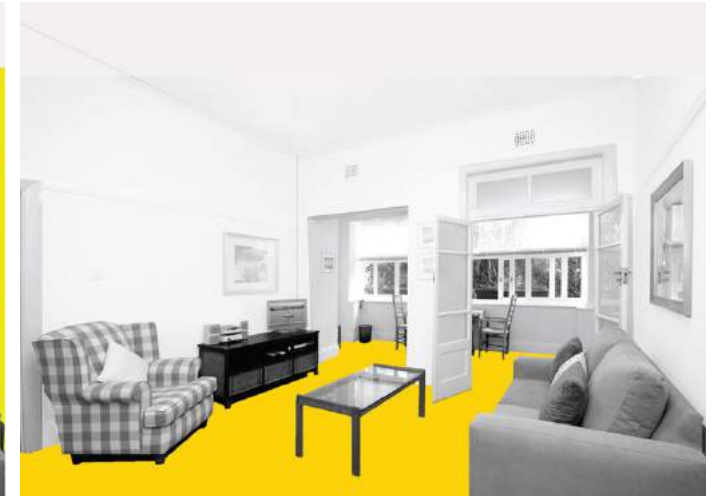
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. **Use of Colours in Interior Design**
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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Source:

<http://www.dsource.in/course/visual-design-colour-theory/use-colours-interior-design>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Yellow when used in home interiors can create a cheerful atmosphere, give a sleek look and can improve ones mood. Application of yellow as the dominant or key colour can often unify and strengthen the over all interior space but if went wrong can seem redundant and hot.

a. Deep yellow with a combination of red when applied to large areas feels hot and loud.



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Visual Design - Colour Theory

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DoD, IIT Guwahati

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<http://www.dsource.in/course/visual-design-colour-theory/use-colours-interior-design>

b. Yellow used in furniture creates interest and feels cheerful.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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DoD, IIT Guwahati

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c, d. Dull yellow in combination with white looks fresh.



e, f. Bright yellow in combination with white looks bright and clean.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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DoD, IIT Guwahati

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<http://www.dsource.in/course/visual-design-colour-theory/use-colours-interior-design>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. **Use of Colours in Interior Design**
10. References and Links
11. Contact Details

• YELLOW:

“Urban Station is a combination interior design of office space and coffee shops located in Palermo Soho area of Buenos Aires. Decorating the bright yellow interior space, giving a double room functions of the perfect working environment and a cozy coffee-shop. Cool vintage furniture chair beside the table art and business magazines, projectors, LCD screens, printers and fax machines, coffee, breakfast and WiFi complete the interior space facilities.

Merging the functions of office space and the coffee-shop designed to provide increased comfort and interaction opportunities for mobile workers. This is an interesting design inspiration for a better quality of life”.

The Designer: Total Tool Design Studio

Source: Copyright © 2010 - 2011 yellowpelow.com



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Colours in Visual Design

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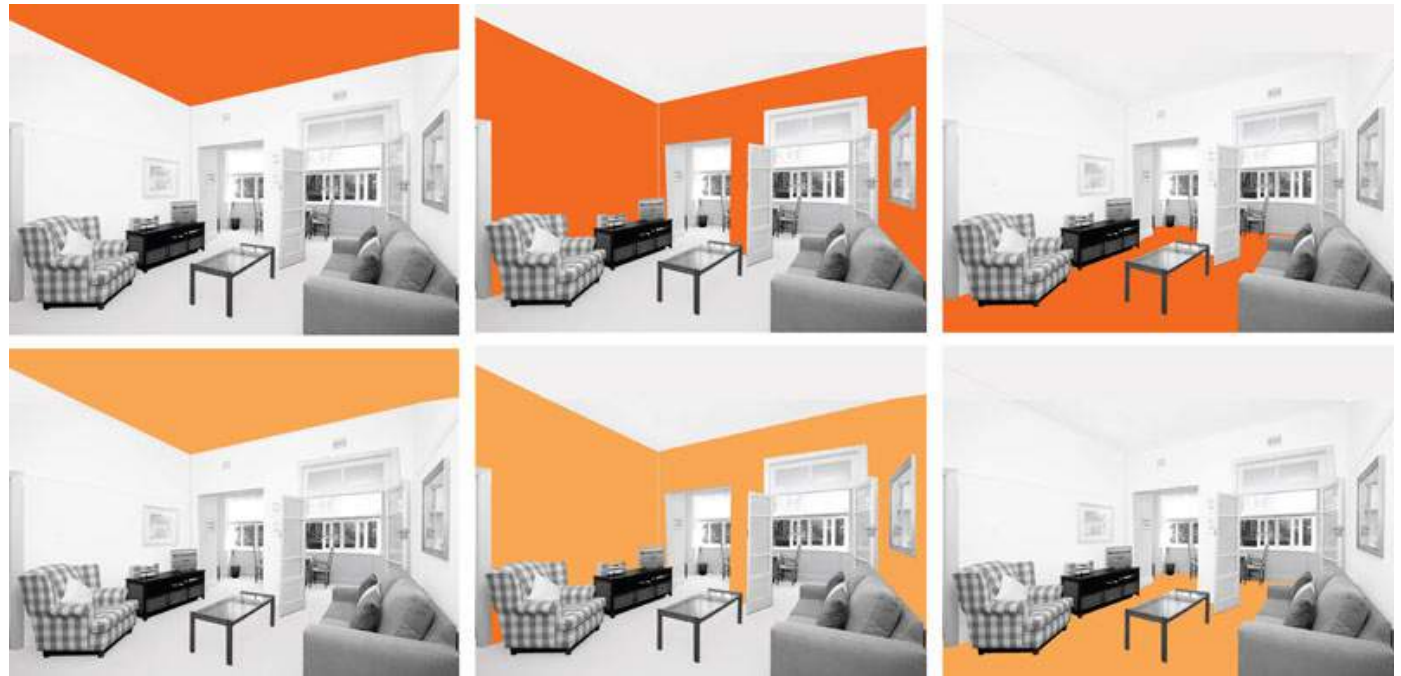
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- **ORANGE:**

- Ceiling: Stimulating, attention-seeking.
- Walls: Warm luminous.
- Floor: Activating, motion-oriented.

Orange can be harsh if it is too bright. Appropriate use of bright orange can create lively and cheerful moods and can be used to highlight surfaces. Calmer tones of orange are easier to live with.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. **Use of Colours in Interior Design**
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

Ms. Shruti Hemani and Prof. Ravi Mokashi Punekar
DoD, IIT Guwahati

Source:

<http://www.dsource.in/course/visual-design-colour-theory/use-colours-interior-design>

• BLUE:

- Ceiling: Celestial, cool if light; heavy, oppressive if dark.
- Walls: Cool, distant if light; encouraging, deepening if dark.
- Floor: Feeling of effortless movement if light; substantial if dark.

Blue can be cold and bleak if applied to large areas.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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• BROWN:

- Ceiling: Oppressive and heavy if dark.
- Walls: Assuring if wood is used.
- Floor: Steady, stable.

Brown works well as natural colour for wood, mud etc. Brown paint is not as comfortable.



Brown can be timeless and classy as well as modern at the same time. Brown is used in many ways throughout interiors and fashion world. Brown lighter to darker tones, brown can be versatile and blend well with other hues.

SOURCE: Edyta & co. Interior Design



1. Introduction

2. Visual Design

3. The Science of Colour

4. Colour Perception and Human Responses

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

Ms. Shruti Hemani and Prof. Ravi Mokashi Punekar
DoD, IIT Guwahati

Source:

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- **PINK:**

- Ceiling: Delicate.
- Walls: Intimate, sweet, feminine.
- Floor: Too delicate, unfamiliar for the location.

Pink is usually used for childrens room and a correct tone can also bring soothing effect.



Kazumi Sushi Lounge, in Montreal, Canada designed by Jean de Lessard is inspired by the ancient oriental art of paper folding revisited in a thoroughly modern and glamorous. Strips and use of glossy pink gives the space as unique character and atmosphere.

SOURCE: trendhousedesign.com;

LINK: <http://delessard.com>

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

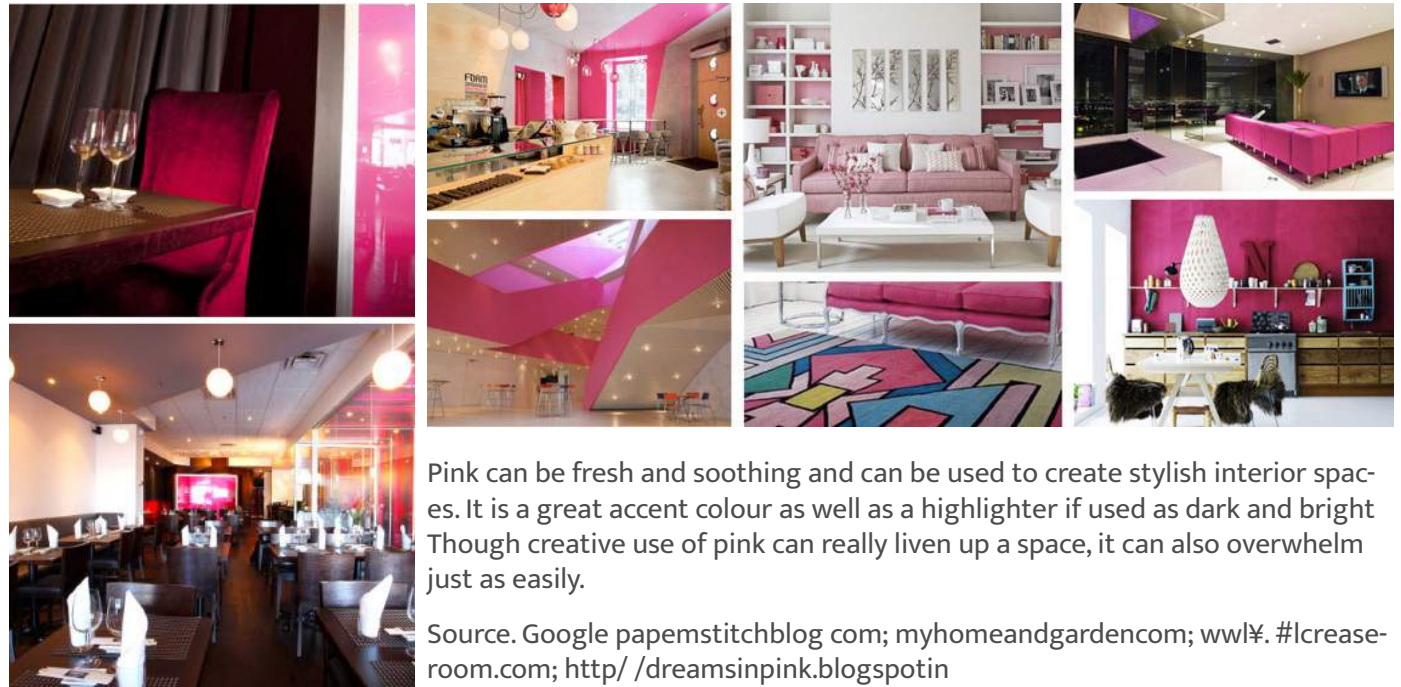
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. **Use of Colours in Interior Design**
10. References and Links
11. Contact Details



Pink can be fresh and soothing and can be used to create stylish interior spaces. It is a great accent colour as well as a highlighter if used as dark and bright. Though creative use of pink can really liven up a space, it can also overwhelm just as easily.

Source. Google papemstitchblog.com; myhomeandgarden.com; wwl¥. #lcrease-room.com; <http://dreamsinpink.blogspotin>

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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DoD, IIT Guwahati

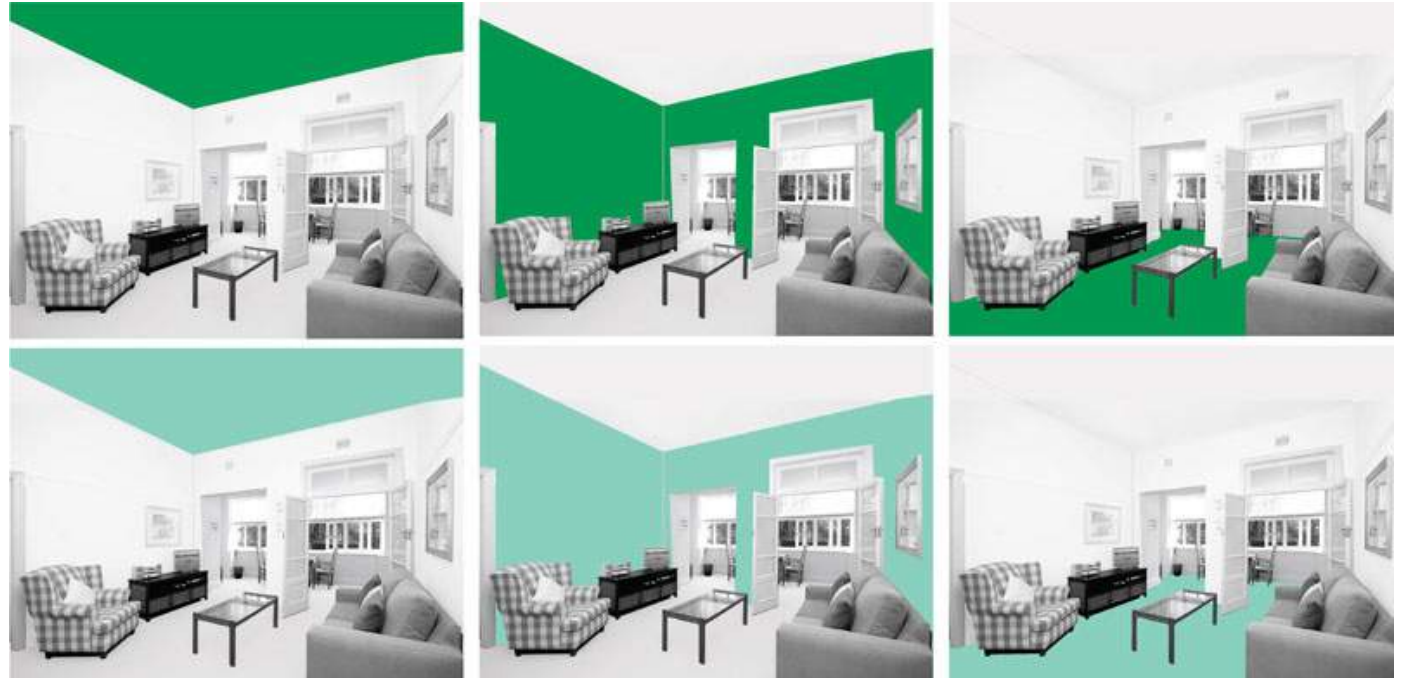
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• GREEN:

- Ceiling: Protective, disturbing if too bright or dark.
- Walls: Cool and calm if mild, can be irritating if dark.
- Floor: Soft, relaxing if softer tones are used.

Green works well as natural colour for leaf etc. Green paint is not as comfort, if dark.



1. Introduction

2. Visual Design

3. The Science of Colour

4. Colour Perception and Human Responses

5. Colour Description and Colour Theories

6. Colour Interaction and Color Effects

7. Colour in Design Principles

8. Use of Colours in Products and Packaging Design

9. Use of Colours in Interior Design

10. References and Links

11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

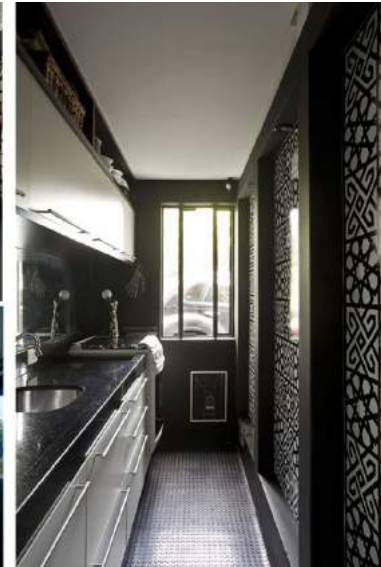
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DoD, IIT Guwahati

Source:

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- **BLACK:**

- Ceiling: Hollow to oppressive.
- Walls: Ominous, dungeonlike.
- Floor: Odd, abstract.



1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. **Use of Colours in Interior Design**
10. References and Links
11. Contact Details

The use of black on walls requires two things courage and well-designed spaces. Black painted walls or even some black accents can change the appearance of space interiors. High ceilings or a lot of natural light are prerequisites for the use of black on walls, but even smaller spaces can look modern and elegant if all the other elements are chosen to contrast and enhance the effect of dark walls. A smaller space can painted in light hues (eg white) to feel more spacious or it can be painted dark (eg black) to accentuate its character.

SOURCE: <http://freshome.com>

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

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DoD, IIT Guwahati

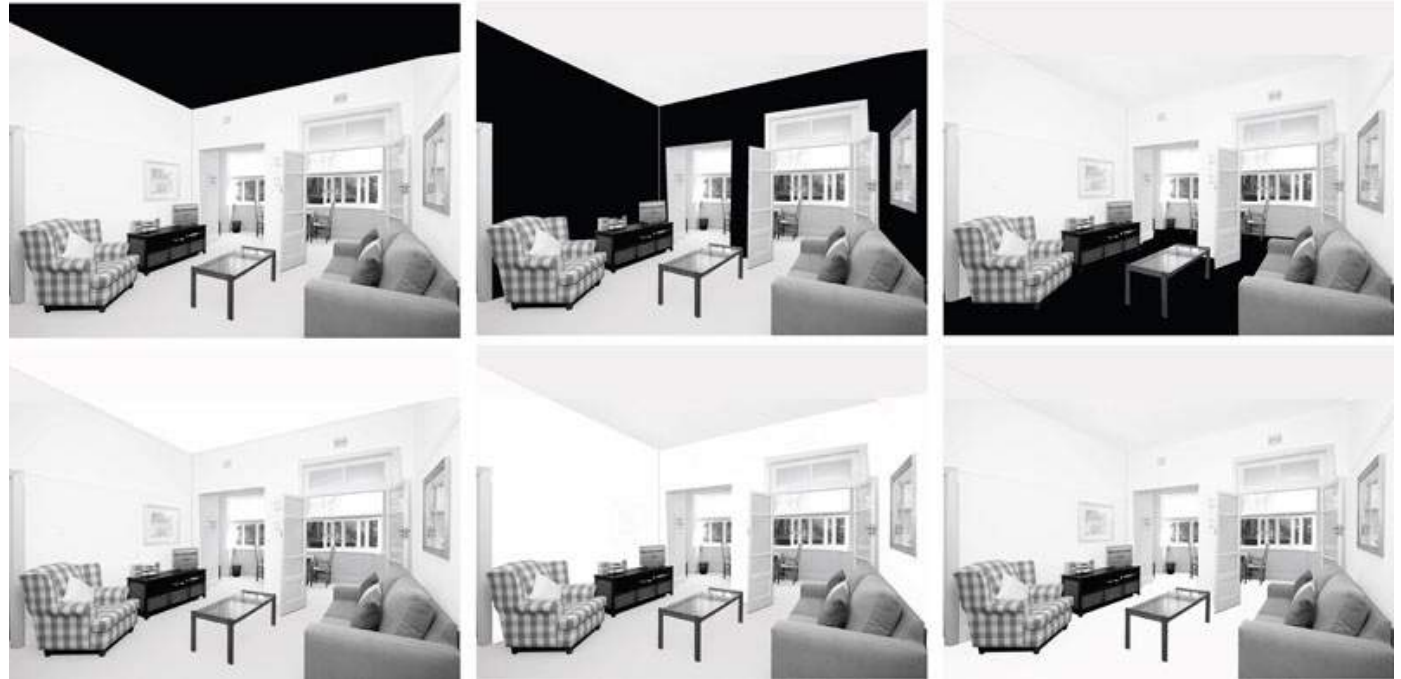
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<http://www.dsource.in/course/visual-design-colour-theory/use-colours-interior-design>

• WHITE:

- Ceiling: Empty
- Walls: Neutral to empty, sterile, without energy
- Floor: Feeling of not to be walked upon.

However, white marble is extensively used for flooring. White is used for temples to symbolise purity. White on walls gives neutral effect and allows use of brighter and various colour accessories and tapestries.



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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

by

Ms. Shruti Hemani and Prof. Ravi Mokashi Punekar

DoD, IIT Guwahati

Source:

<http://www.dsource.in/course/visual-design-colour-theory/use-colours-interior-design>

Assignment 2: Colour Scheme for toilet Interior:

Based on your knowledge so far develop the colour scheme for this toilet interior.

Folded Elevation - Attached Toilet

- Grafine Tropical storm (blue) 300x450
- Grafine Tropical flint (ivory) 300x450
- Grafine 75x300mm border

Octopus natural green 300x300mm (30/-sq ft)

Grafine Tropical storm (blue) 300x450

Natco maharaja rustic Ivory 450x450mm

Based on your knowledge so far develop the colour scheme for this toilet interior

Attached Toilet details / scale 1:25
Shruti Hemani

Plan

1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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- Vogler D.: <http://www.fuelyourproductdesign.com>
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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. **References and Links**
11. Contact Details

Design Course

Visual Design - Colour Theory

Colours in Visual Design

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This documentation for the course was done by Ms. Shruti Hemani and Professor Ravi Mokashi Punekar faculty at [DoD, IIT Guwahati](#).

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1. Introduction
2. Visual Design
3. The Science of Colour
4. Colour Perception and Human Responses
5. Colour Description and Colour Theories
6. Colour Interaction and Color Effects
7. Colour in Design Principles
8. Use of Colours in Products and Packaging Design
9. Use of Colours in Interior Design
10. References and Links
11. **Contact Details**